

## DIVERTICULAR DISEASE; IS IT AN UNDERESTIMATED PROBLEM IN OUR LOCALITY?

By

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**Background:** Colonic diverticular disease is common in Western countries. It is often asymptomatic; only 10-26% of patients will progress to diverticulitis with symptoms ranging from minor complaints to life threatening sequelae.

**Objectives:** To recognize the pattern of presentation, diagnosis, treatment and outcome of diverticular disease in our community.

**Methods:** From January 1996 to June 2004, 19 patients with diverticular disease were retrospectively studied.

**Results:** Twelve patients were males and 7 females. Mean age was  $59 \pm 2.9$  (range 47.5 -71) years. Fifteen patients (90%) presented with left lower quadrant pain, bleeding per rectum in 5 patients (26.3%), tender left lower quadrant mass in 3 patients (15.8%) and acute abdomen in 3 patients (15.8%). Diagnosis was done using ultrasonography, colonoscopy, barium enema and CT. Conservative treatment was successful in 12 patients (63.2%). Seven patients (36.8%) required surgery. Hartmann's procedure was done in 5 patients (71.4%), and one-stage colonic resection was done in 2 patients (28.6%). Postoperative complications were encountered in 2 patients (28.6%). No reported mortality.

**Conclusion:** Diverticular disease is not uncommon in our locality, and requires high index of suspicion and multidisciplinary approach for proper diagnosis and management. The majority of cases are treated conservatively but surgery remains safe in some patients. Resection and primary anastomosis has an acceptable morbidity and mortality. For high-risk patients, Hartmann's procedure remains a gold standard.

**Keywords:** Diverticular disease, management.

### INTRODUCTION

Colonic diverticulosis is one of the most common diseases in developed western countries with 30-50% of adults over the age of 60 being affected.<sup>(1,2,3)</sup> In the United States, diverticulosis occurs in approximately one third of population older than age of 85 years, and it also affects a significant proportion of younger adults.<sup>(4,5)</sup>

Diverticulosis indicates the presence of multiple diverticulae and generally implies absence of symptoms. Diverticular disease signifies any clinical state caused by diverticulae including hemorrhage, inflammation, or their complications. Diverticulitis describes the

presence of an inflammatory process associated with diverticulae.<sup>(5,6)</sup>

Diverticulosis coli is common in the left side, predominantly involves the sigmoid colon.<sup>(3)</sup> Diverticulae of the right colon are often isolated, are usually not associated with left-sided diverticular disease, occur in younger patients (often in the third and fourth decade), and are frequent in Asians.<sup>(7,8)</sup>

The cause remains unknown, but epidemiological studies indicate that low-fiber diet together with increased intra-colonic pressure is the main etiological factors.<sup>(1,2)</sup> The intraluminal pressure exerted on the wall causes a

diverticular outpocketing at any one of the three areas in which vessels enter the wall.<sup>(9)</sup>

Diverticulosis is often asymptomatic; however, 10% to 25% of patients will ultimately progress to diverticulitis and present with symptoms ranging from minor complications to life-threatening sequelae.<sup>(5,6)</sup>

Ultrasound, CT and water-soluble contrast enema may be required for establishment of diagnosis.<sup>(9)</sup> Early colonoscopy in patients with acute diverticulitis may alter the working diagnosis and be of therapeutic value according to the finding.<sup>(11)</sup> MRI-based colonography is a new minimally invasive imaging modality that revealed the same diagnosis as CT colonography (CTC) without ionizing radiation.<sup>(12,13)</sup>

Diverticulitis has been described as a more virulent disease in young patients, necessitating an aggressive surgical approach.<sup>(14)</sup>

Conservative or medical management is usually indicated for acute uncomplicated diverticulitis. Indications for surgery include recurrent attacks and complications of the disease. Surgical treatment options have changed considerably over the years along with the inventions of new diagnostic tools and new surgical therapeutic approaches. Indications and timing for surgery of diverticular disease are determined mainly by the stage of the disease.<sup>(15)</sup>

## PATIENTS AND METHODS

Nineteen patients with the diagnosis of colonic diverticular disease were studied retrospectively. Patients were admitted to general surgery department and causality unit in Sohag University Hospital and Kasr El-Aini university hospitals in the period from January 1996 to June 2004 and were proven to have diverticular disease.

Patients were subjected to clinical evaluation, routine laboratory investigations (stool examination, CBC, blood sugar, renal & liver functions, and coagulation profile), plain X-ray abdomen in the erect position and abdominal ultrasound. Further investigations were requested for those patients; when there was suspicion that they might have colonic problems. They were subjected to double contrast barium enema, colonoscopy and CT abdomen and pelvis for some selected cases. After this battery of investigations, they proved to have colonic diverticular disease. Double contrast barium enema (Fig. 1) was done for 11 patients; colonoscopy was done for 10 patients (Figs. 3,4) and CT abdomen and pelvis for 2 patients (Fig. 2).

*Conservative treatment was tried in all patients. They were given*

- Liquid diet and oral antibiotics (quinolone with metronidazol) in 14 patients who presented a picture which did not need urgent surgical interference. The course of medical treatment was continued for at least 7 days; however, antibiotics were continued for 10-14 days with high fiber diets. Medical treatment was continued in this group when they showed response in the first 2-3 days of treatment, in the form of pain decrease and less tenderness and start of fever subsidence.
- Intravenous fluids and also IV antibiotics were obligatory given in 5 patients. They were subjected to urgent surgical interference as they did not show any improvement under conservative treatment. Blood transfusion of up to 6 units was given for those patients with massive bleeding per rectum with signs of hypovolaemia.

Surgical treatment was required in 5 patients who presented in emergency situation (acute generalized peritonitis, colonic obstruction, massive bleeding per rectum and localized pericolic abscess). Surgery was also required for 2 patients in whom conservative measures failed. Surgical procedures performed including Hartmann's procedure and one stage resection anastomosis. Colonic preparation was carried out either preoperatively (oral Sodium Pico sulphate 750 mg and multiple enemata by Monosodium phosphate 16gm & disodium phosphate 6gm or saline) or by intra-operative colonic lavage with saline in emergency cases.

After surgery; all excised specimen were sent for histopathological examination. Specimens were fixed in 10% formalin for fixation, trimmed then processed and embedded in paraffin blocks. Five micron tissue sections mounted on a glass slide were made and stained by hematoxylin and eosin (H & E) then covered and microscopically examined.

## RESULTS

Nineteen patients with diverticular disease were included in this study (12 males and 7 females). Their mean age was 59±2.9 years, (range 47.5 -71years) and 53.2% of them were under the age of 50 years.

The clinical presentations were left colonic manifestations (left lower quadrant pain and alteration of bowel habits) in 15 patients (90%), bleeding per rectum in 5 patients (26.3%) in 3 of them the bleeding was massive, left lower

quadrant tender mass associated with fever, tenesmus and leucocytosis in 3 patients (15.8%) and acute abdomen in 3 patients (15.8%); 2 (10.5%) with peritonitis and 1 (5.3%) with colonic obstruction, Table 1.

Conservative treatment was successful in 12 out of 19 patients (63.2%). The remaining 7 patients (36.8%) required surgical intervention. Hartmann's procedure was done in 5 patients (71.4%); 2 patients with peritonitis, 2 patients with localized abscess and one with colonic obstruction. One-stage colonic resection anastomosis was done in 2 patients (28.6%); sigmoidectomy in one patient with localized pericolic abscess and subtotal colectomy (Fig. 5) in another patient (14.3%) with extensive diverticulae causing massive bleeding per rectum Table 2.

Postoperative complications occurred in 2 settings (28.6%). One patient developed heavy wound infection and

subsequent burst abdomen and had been treated by surgical repair with retention suture. The other patient was complicated with fecal fistula which was managed conservatively and didn't required re-do surgery. No reported mortality in our series Table 3.

Gross examination of submitted specimens revealed that the diverticulae are located on the mesenteric and lateral aspects of the bowel. They have a flask like shape, some are filled with faeces, and the others are filled with mucin. Microscopically the diverticulum lacks a muscle layer except for residual bundles of muscularis mucosa. Diverticular wall shows chronic inflammatory cell infiltrate mainly lymphocytes and macrophages with occasional eosinophiles in 3/7 patients (Fig. 7), lymphoid follicles in 3/7 patients (Fig. 8), and no apparent histopathology other than the diverticulum itself in 1/7 patient (Fig. 6).

**Table 1. Clinical presentations.**

Presentation*	No. of patients (19)	Percentage
Left colonic manifestation (left lower quadrant pain and alteration of bowel habits)	15	90%
Bleeding per rectum	(5)	26.3%
Left lower quadrant mass with fever, tenesmus and leucocytosis	3	15.8%
Acute abdomen	(3)	15.8%
Peritonitis	2	10.5%
Colonic obstruction	1	5.3%

\* Patients may have more than one complaint

**Table 2. Management of diverticular disease**

Management	No. of patients	Percentage
Medical treatment	12/19	63.2%
Surgical treatment:	7/19	36.8%
Hartmann's procedure	5/7	71.4%
One stage colonic resection anastomosis	2/7	28.6%
a) Sigmoid colectomy	1/7	14.3%
b) Subtotal colectomy	1/7	14.3%

**Table 3. Postoperative complications**

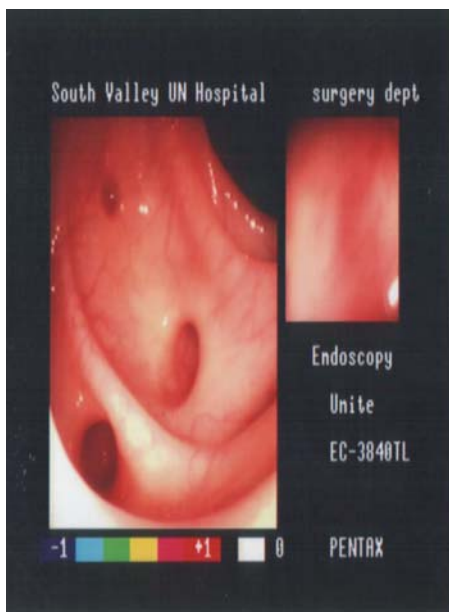
Complication	No. of patients	Percentage
Wound infection and burst abdomen	1/7	14.3%
Fecal fistula	1/7	14.3%



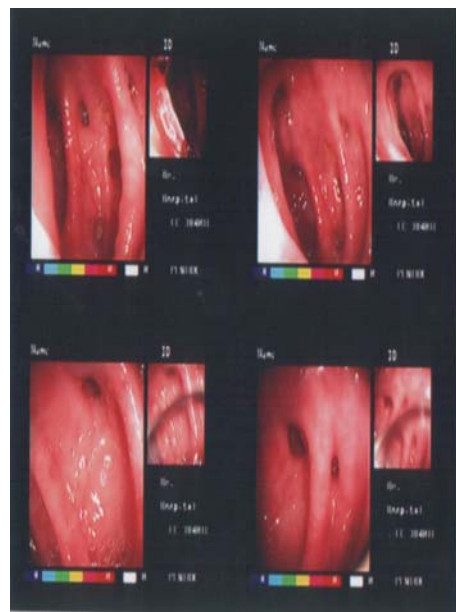
*Fig 1. Ba. Enema, post evacuation film showing multiple diverticulae in the left colon.*



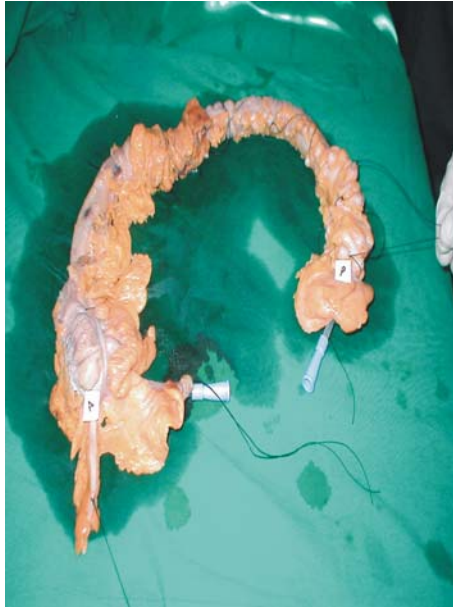
*Fig 2. CT showing a phlegmon in complicated sigmoid diverticulitis.*



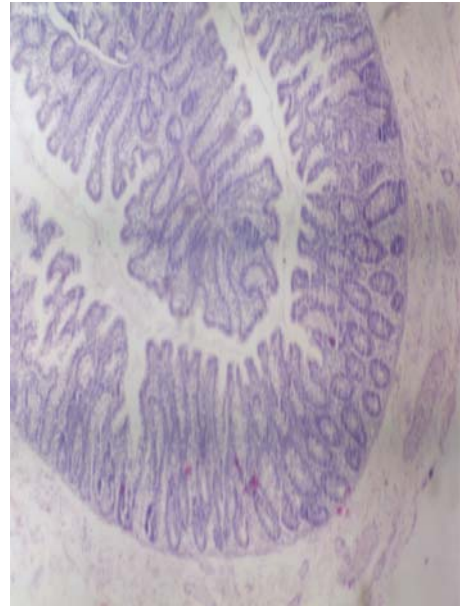
*Fig 3. Colonoscopic picture showing wide openings of multiple diverticulae.*



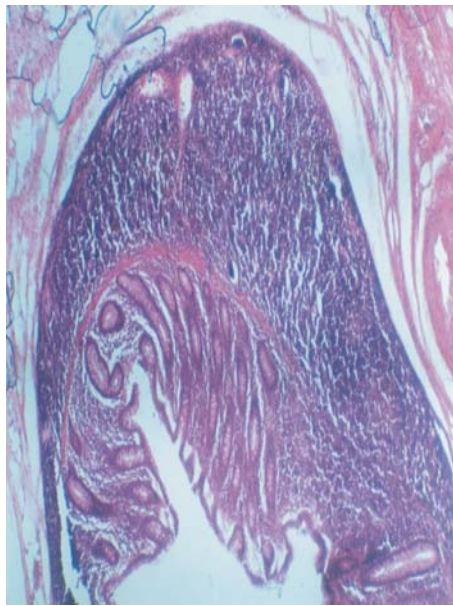
*Fig 4. Colonoscopic picture showing openings of diverticulae with severe colitis.*



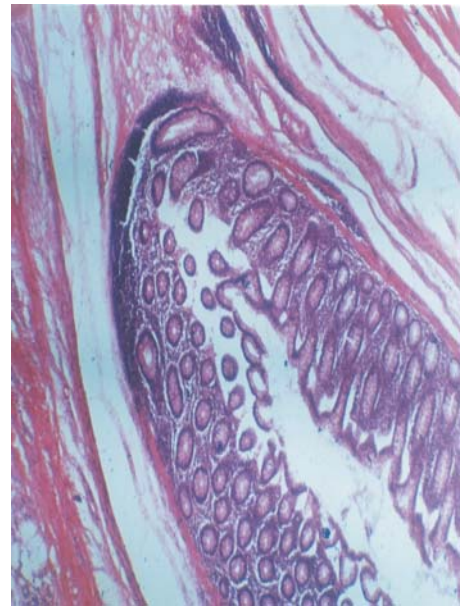
*Fig 5. Surgical specimen of subtotal colectomy for diffuse colonic diverticulae.*



*Fig 6. M.P. of colonic diverticulum showing no apparent pathological changes.*



*Fig 7. M.P. of colonic diverticulum with chronic inflammatory cell infiltrate.*



*Fig 8. M.P. of colonic diverticulum showing lymphoid aggregates and dilated vessels.*

## DISCUSSION

Diverticular disease of the colon is a very frequent pathology in the western world and is characterized by a high percentage of dangerous complications (10-25%).<sup>(16)</sup> It can be classified as symptomatic uncomplicated disease, recurrent symptomatic disease, and complicated disease.<sup>(15)</sup> After one episode of diverticulitis one-third of patients have recurrent symptoms; after a second episode a further third have a subsequent episode.<sup>(17,18)</sup>

Pathogenesis of the disease is still unknown. However, it is the result of complex interactions between colonic structure, intestinal motility, diet and genetic factors. Whilst efficacious preventive strategies remain to be identified, fiber supplementation in the diet is recommended. Why symptoms develop is still unclear. Results of recent experimental studies on irritable bowel syndrome speculated that low grade inflammation of colonic mucosa, induced by changes in bacterial microflora, could affect the enteric nervous system, which is crucial for normal gut function, thus favoring symptom development.<sup>(19)</sup>

In our study, 19 patients admitted to general surgery department and to causality centre with mean age of 59±2.9 years, range 47.5 -71 years and 53.2% of patients were under the age of 50 years. This came in accordance with the report of West et al (2003) regarding admission to the surgical service with the diagnosis of diverticular disease. The mean age in this report was 45.5 years, range 21 to 86 and 72% of patients were under the of 50 years.<sup>(20)</sup>

Chautems et al (2002) published an age range between 23-93 years for this disease,<sup>(21)</sup> while Bahadursingh et al (2003) reported a mean age of 61 years, range 28 to 90 years.<sup>(22)</sup> Also they reported that 59% of his patients were female compared to 37% in our study. This difference may be attributed to small sample in our study as well as high prevalence of disease in western countries.

The most common presentation in our study was left lower quadrant abdominal pain which matches the results of Bahadursingh et al (2003).<sup>(22)</sup>

Diverticular disease accounts for 50% of adult cases of lower gastrointestinal bleeding. Recurrent or persistent bleeding usually is treated surgically. Recent studies suggest that 20% of patients with diverticular bleeding can have the site identified and treated endoscopically,<sup>(23,24,25)</sup> in our study 26.3% of patients of diverticulosis have bleeding per rectum and endoscopy is diagnostic in 3 cases. However therapeutic endoscopy was not employed in our series, this is due to lack of expertise and facilities for such interference.

In study of Bahadursingh et al (2003) main lines of investigation were computed tomography (CT) scan of the

abdomen and pelvis, contrast enema, colonoscopy and a small bowel series. Diverticulosis is a challenge for CTC to avoid false-positive diagnosis of polypoid and tumoral disease. In case of equivocal findings additional conventional colonoscopy should be advised whenever a clinically significant lesion (> or = 1 cm) is suspected.<sup>(13)</sup> In our study the main line of investigations were plain X ray erect abdominal and pelvic ultrasonography, barium enema, double contrast enema, CT abdomen and pelvis and colonoscopy.

Colonic diverticular disease is a common disorder in elder patients. Uncomplicated diverticulitis can be prevented from progressing into complicated diverticulitis by early diagnosis and active medical treatment. Complicated diverticulitis develops from a peridiverticular abscess, to a perforation with peritonitis, to fistulation into adjacent viscera, to luminal narrowing by inflammation or stricture formation causing obstruction.<sup>(26)</sup>

Medical treatment was usually recommended as the first line management for this disease.<sup>(27)</sup> At the turn of the century the medical treatment of colonic diverticulosis involved the avoidance of roughage, which was felt to exacerbate the problem. However, the use of high fiber diets in the prevention and treatment of the symptoms of diverticular disease has now become common place.<sup>(28)</sup> Uncontrolled data suggests that most patients respond satisfactorily to treatment with a high fiber diet, antibiotics and/or aminosalicylates.<sup>(24)</sup> In our study medical treatment was carried out in 19 patients with complete relief of their complaint in 12 patients (63.2%), this is supported well by Bahadursingh et al (2003) who reported successful conservative treatment in 62%.<sup>(22)</sup>

Somasekar et al (2002), retrospective study was done on all patients admitted with complicated diverticular disease, the details of management of the complications and past history of the investigations and treatment for diverticular disease in these patients showed that 98 patients (91%) were admitted as an emergency for perforated diverticular disease and rectal bleeding. Ten patients were urgent admissions for fistulae and diverticular phlegmons. Ninety eight patients underwent a Hartmann's operation, two had a subtotal colectomy and 4 patients had a sigmoid colectomy. Thirty-four (31.4%) patients died in the hospital post-operatively.<sup>(29)</sup> McConnell et al (2003) were reported that total of 934 patients requiring surgical resection for diverticular disease was admitted. Forty-nine patients presented with massive rectal bleeding, 329 with chronic diverticulitis 61 with obstructive symptoms 148 with fistulas, 170 with perforation, 79 with abscess, 59 with stricture, and 39 with acute diverticulitis.<sup>(30)</sup>

In our study which is also a retrospective study on 19 cases with diverticulitis, localized abscess, peritonitis and colonic

obstruction, surgery was performed in 7 patients (36.8) in the form of Hartmann's procedure which was done in 5 patients (71.4%); two patients with peritonitis, two with localized abscess and one with colonic obstruction. One-stage colonic resection anastomosis was adopted in 2 patients (28.6%); sigmoid colectomy in one patient with localized pericolic abscess and subtotal colectomy in another patient (14.3%) with extensive diverticulosis causing massive bleeding per rectum. This difference can be attributed to the difference in incidence and epidemiology of the disease in Europe and our locality.

Surgery for diverticular disease has a high complication rate and 25% of patients have ongoing symptoms after bowel resection.<sup>(18)</sup> The surgical management of left-sided large bowel emergency patients remains controversial. There has been an increasing trend towards primary reconstructive surgery. The main dilemma remains appropriate patient selection for primary anastomosis.<sup>(31)</sup> The practice of resection and primary anastomosis for acute sigmoid diverticulitis at the Royal Columbian Hospital has an acceptable morbidity and mortality.<sup>(32)</sup> Also others suggested that colonic resection with primary anastomosis, even without colostomy, is a safe procedure for the emergency treatment of acute complicated diverticulitis.<sup>(33)</sup> Finally, it is submitted to surgeon's experience to choose, at any situation, the best procedure regarding age and general state, local findings and extent of peritonitis.<sup>(27, 34, 35)</sup>

Biondo et al (2002) were reported that the diagnosis was confirmed histologically or radiologically in all patients. During the first hospital stay, 226 patients (69.1%) had successful conservative treatment, 78 (23.9%) needed emergency surgery and 23 (7.0%) had a semielective operation.<sup>(36)</sup> In our study diagnosis confirmed radiologically in 13 out of 19 patients and all surgical specimens were proven histopathologically. These results are similar to our results and supported by other published reports of Bahadursingh et al (2003).<sup>(22)</sup>

Biondo et al (2001) found one or more complications were detected in 25 patients (45.4%). Four patients (7.2%) required reintervention. Mortality occurred in four patients (7.2%). Two patients (3.6%) presented with anastomotic leakage, 16 patients with wound infection (29%).<sup>(37)</sup> In our study wound sepsis and subsequent burst abdomen had been accounted once and treated by surgical repair with retention suture. Another patient had fecal fistula that was managed conservatively. No mortality was reported in our series

Blair & Germann (2002) reported that unprotected primary anastomosis had been done for 85% of their patients who were undergoing emergency surgery for acute sigmoid diverticulitis. There was 1 anastomotic leakage, 7 wound infections, and 3 deaths with an average length of stay of 9 days.<sup>(32)</sup> Mortality with intraoperative colonic lavage was

11% and with Hartmann's procedure 12%. The incidence of postoperative complication was significantly higher after Hartmann's procedure. The mean hospital stay was significantly longer after Hartmann's procedure than after primary resection with intraoperative colonic lavage. Similar results of Zorcolo et al (2003) who reported that Hartmann's resection was associated with a higher incidence of systemic and surgical morbidity (39.5% and 24.3%, respectively). The mortality rates in those selected for primary anastomosis (5.7%) compared favorably with those undergoing Hartmann's resections (20.4%).<sup>(31)</sup>

On the other hand, Makela et al (2002) noticed that there is no difference between primary resection anastomosis and Hartmann's procedures as regards morbidity and mortality.<sup>(38)</sup> Our results correlated well with the previous views where we were obliged to perform Hartmann's procedure in 71.4% (5/7) of cases due to massive sepsis and bad general condition of the candidates. However, primary resection anastomoses adopted in 28.6% (2/7) of cases under favorable condition (no massive sepsis and good general condition of the patients).

Although diverticular disease is common in Western countries, it is not uncommon in our locality, however, high index of suspicion and multidisciplinary approach of radiologists, gastroenterologists as well as surgeons is the hallmark for proper diagnosis and management of the disease. The presentation of the disease, investigations, and management are variable. The majority of patients are treated conservatively but surgery remains safe for some cases. Primary resection anastomosis for diverticular disease has an acceptable morbidity and mortality, moreover, for high-risk patients; Hartmann's procedure remains a gold standard.

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