

Experience of managing complicated diverticulitis of colon: a retrospective case series from south asian country

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Abstract

Objective: To assess the morbidity and mortality associated with complicated diverticulitis in Pakistan.

Methods: The retrospective case series was conducted at an urban tertiary care university hospital of Karachi, Pakistan, comprising data from December 1989 to November 2010. International Classification of Diseases codes for diverticular disease and diverticulitis with abscess, fistula, stricture, bowel obstruction and perforation were obtained from the medical record department. SPSS 19 was used for statistical analysis.

Results: A total of 60 (1.9%) cases with complicated diverticulitis were located from among 3170 records reviewed. Mean age was 62.7±13 years with male-to-female ratio being 36:24. In 37 (62%) patients, the diagnosis was established on computed tomography scan of the abdomen, followed by barium enema in 12 (20%) and colonoscopy in 11 (18%). Post-operative morbidity was observed in 24 (40%) and 7 (16%) expired within 28 days of surgery. Post-operative intra-abdominal sepsis, wound dehiscence and incisional hernia were significantly associated with generalised peritonitis ($p < 0.05$), while admission to intensive care unit was associated with age over 60 years and faecal peritonitis. Post-operative mortality was significantly associated with high American Society of Anaesthesiologists-score III and IV and age above 60 years.

Conclusion: Complicated diverticulitis carries significant morbidity and mortality in Pakistani population. Since the trend is on the rise, therefore we propose a prospective multi-centre cohort study to understand the spectrum of disease, management and identification of risk factors to achieve the best possible outcomes in patients with complicated diverticulitis.

Keywords: Complicated Diverticulitis, Diverticular Abscess, Generalized Peritonitis, Diverticular Stricture, Diverticular Perforation. (JPMA 64: 409; 2014)

Introduction

Diverticular disease is considered to be the disease of Western civilisation and has reached the level to be labelled as an epidemic in modern industrialised nations. The reported prevalence from Western societies ranges between 5-45%, with the majority having an affected left side of the colon,¹ and 65% of the population by 80 years of age or older will harbour some form of diverticular disease of the colon.² There are few studies from South Asian countries which have reported its prevalence of 19.7%³ where most of the literature showed involvement of the right side of the colon in 70% of the population suffering from diverticular disease.⁴

The spectrum of clinical features extends from asymptomatic diverticulosis to recurrent episodes of acute diverticulitis which may lead to potentially fatal complications. By definition, complicated diverticulitis is

a perforation of a diverticulum leading to generalised peritonitis, bowel obstruction, abscess, and fistula and stricture formation requiring surgical management in most of the cases.⁹ Complicated diverticulitis is less common, but carries high morbidity rate up to 44%⁵ and mortality rate reported is between 1% and 16.7%.^{6,7} Appropriate management of patients with acute diverticulitis is dependent on the severity of the disease where antibiotics may be appropriate for uncomplicated colonic diverticulitis, while about 25% of the patients will require surgical intervention in more severe forms of diverticulitis to achieve an optimal outcome.⁸ Based on the high morbidity and mortality rate, an elective surgery is recommended after two attacks of uncomplicated diverticulitis as per guidelines of the American Society of Colon and Rectum and the European Association of Endoscopic Surgery.⁹ Surgery can be conventional or laparoscopic depending on the expertise and facilities available. One-stage colonic resection and anastomosis or two-stage procedures including colectomy with diverting ileostomy or Hartman's procedures followed by reversal can be performed.¹⁰⁻¹²

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During the literature review, we came across a few population-based studies on the prevalence and incidence of complications in diverticular disease from South Asian countries,^{3,13} but did not find any such study from Pakistan. The present study was conducted to look at the spectrum of the disease, its management and outcome of complicated diverticulitis in patients admitted to an urban tertiary care university hospital of Pakistan over a period of 21 years.

Patients and Methods

The retrospective case series was conducted in an urban tertiary care university hospital of Karachi, Pakistan, from December 1989 to November 2010. International Classification of Disease (ICD) codes for diverticular disease and diverticulitis with abscess, fistula, stricture, bowel obstruction and perforation were obtained from the medical records department.

The records of patients were retrieved and the required information was gathered on the database forms. The inclusion criteria were all adult patients (age >18 years) with clinical, radiological, colonoscopic and histopathological evidence of complicated diverticulitis. Patients who presented with diverticular haemorrhage, having incomplete medical records and those with concomitant bowel carcinoma were excluded.

The information recorded on the proforma included demographics (age, gender, co-morbid conditions, American Society of Anaesthesiologists (ASA) scores, previous documentation of diverticular disease, admission details, duration of complaints, emergency/elective, length of stay, intensive care unit (ICU) stay. Total leukocyte count (TLC) > 11,000 was considered leukocytosis. Chest and abdominal X-rays, computed tomography (CT) scans, colonoscopic and barium enema details were noted. Treatment modalities (conservative/radiological intervention/surgical), indications for emergency versus elective procedures, intra-operative findings and operative procedures were also recorded. Outcome variables, including post-operative morbidity, surgical site infection as per Centre of Disease Control (CDC) guidelines,¹⁴ intra-abdominal abscess, anastomotic leak, wound dehiscence, incisional hernia, ICU admission, re-admission, length of total and ICU stay and mortality within 30 days were recorded. Emergency surgery was defined as need for operative intervention of any admission during the index hospital admission, and mortality was confirmed by brain stem death criteria. Files were reviewed by surgical residents and medical students who were briefed on how to fill the proforma. Data entry and analysis was done on SPSS-19.

Percentages and proportions were calculated for categorical data and Chi-square test was applied for analysis. Continuous data was expressed as mean with standard deviation (SD) and independent student T-test was applied for analysis and $p < 0.05$ was considered statistically significant.

Results

Initially, medical records of 3170 patients were retrieved for the review process. Of them, 60 (1.9%) patients with complicated diverticulitis were included in the study. The mean age was 62.7 ± 13 years with male-to-female ratio being 3:2 (Table-1). Overall, 14 (23%) patients were known to have diverticular disease, and 8 (13.3%) were immunocompromised as they were on steroids.

Besides, 45 (75%) patients had been admitted via emergency room (ER) and the most common presenting complaint was abdominal pain in 45 (75%) patients, followed by constipation in 22 (36%), urinary symptoms in 10 (16%), and bleeding per rectum in 8 (13%). Median duration of symptoms was 7 days (range 1-300 days). In 37 (62%) patients, the diagnosis was established by computed tomography (CT) scan of abdomen followed by

Table-1: Associated co-morbid conditions.

Condition	Number (%)
Diabetes Mellitus	10 (17)
Ischaemic Heart Disease	10 (17)
Hypertension	26 (43)
Known case of Diverticular Disease	14 (23)

Table-2: Indications of surgery.

Indication	Emergency Surgery	Elective Surgery
Perforation	20	1
Intra-Abdominal Abscess	2	0
Fistula		
Colovesical	2	7
Colovaginal	0	3
Colon Stricture	2	8
Bowel Obstruction	0	0

Table-3: Types of surgery.

Type of surgery	Emergency Surgery	Elective Surgery
Resection and Anastomosis	07	13
Hartmann's Procedure	12	05
Diverting Colostomy	06	01
Peritoneal Washout and Drainage	01	0

Table-4: Factors associated with post-operative morbidity.

Variables	Intra-Abdominal Abscess			Wound Dehiscence			Incisional Hernia			ICU stay		
	N	%	p-value	N	%	p-value	N	%	p-value	N	%	p-value
Age < 60 years	3	19	0.09	2	13	0.58	1	6	0.43	0	0	0.045
Age > 60 years	1	3	0.09	2	6	0.58	6	17	0.43	8	23	0.045
Purulent Peritonitis	3	33	0.03	1	11	0.02	0	0	0.04	1	11	0.02
Faecal Peritonitis	1	13	0.03	3	38	0.02	3	38	0.04	3	38	0.02
ASA I and II	2	17	0.57	1	8	0.68	2	17	0.68	0	0	0.08
ASA III and IV	2	7	0.57	3	11	0.68	5	19	0.68	6	23	0.08

ICU: Intensive Care Unit. ASA: American Society of Anaesthesiologists.

Table-5: Factors associated with post-operative mortality.

Variables	N	%	P-value
Age < 60 years	0	0	0.045
Age > 60 years	7	16	0.045
ASA I and II	0	0	0.03
ASA III and IV	7	16	0.03

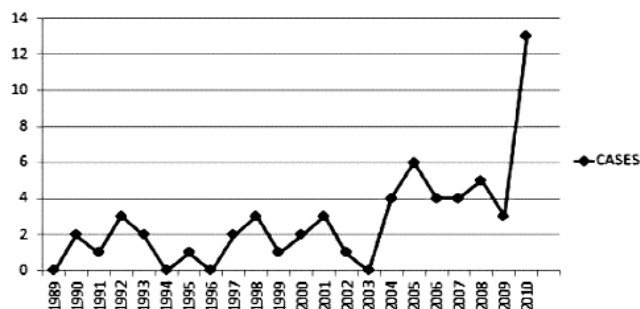


Figure: Trend of patients presenting with complicated diverticulitis with subsequent years.

barium enema in 12 (20%) and colonoscopy in 11 (18%).

Moreover, 46 (76%) patients had presented with complicated diverticulitis as their first manifestation of diverticular disease. Of those who had presented in ER, 26 (43%) patients underwent emergency surgery. Out of these 26 patients, 19 (73%) were categorised with a high ASA (III/IV) grade.

Most common complication was perforation in 21(35%) patients, while 13 (22%) had intra-abdominal abscess, 12 (20%) had bowel fistulas, 11 (18%) had colonic stricture and 3 (5%) had presented with acute intestinal obstruction. Sigmoid Colon was the most common site of involvement in 51 (86%) patients.

Out of 21 perforations, 18 (86%) were found in Sigmoid Colon, 2 (10%) in Transverse Colon and 1 (4%) in

Descending Colon. Out of 21 patients who had developed perforation; 1 (4%) had concealed perforation which was picked up on barium studies in outpatient department (OPD) and underwent resection and anastomosis. Out of the remaining 20 patients with perforation, 9 (45%) had faecal peritonitis which explains the popularity of Hartmann's Procedure and diverting colostomy as the choice of emergency surgical procedure (p=0.02).

Of the 13 patients who had presented with intra-abdominal abscess, 2 (15%) underwent emergency surgery as they were in multiple organ dysfunction secondary to sepsis and the other 11 (85%) underwent percutaneous radiological guided drainage and antibiotics. Three (27%) of these 11 patients after discharge presented multiple times in the clinic with abdominal pain and thus underwent surgery for non-resolving pelvic abscess requiring a second admission.

Of the 12 patients with fistulas; 9 (75%) were colovesical and 3 (25%) colovaginal. Two (17%) patients with colovesical fistula underwent emergency surgery due to deranged physiological parameters (severe sepsis) and underwent diverting transverse colostomy because dense inflammatory adhesions in the pelvis and to shorten the operative time. Besides, 7 (58%) patients with colovesical and 3 (25%) with colovaginal underwent elective surgery with resection and anastomosis, excision of fistulous tract. All 3 (25%) patients who harboured colovaginal fistula had a past history of hysterectomy.

Out of 11 patients who had a colonic stricture, 2 (18%) underwent emergency diverting colostomy as they were in sepsis secondary to obstruction, while 8 (72%) got admitted electively and underwent resection and anastomosis. One (11%) patient was managed on full liquid diet and couldn't be operated upon because he was unfit for surgery because of multiple co-morbid.

All three patients (100%) who had presented with small intestinal obstruction were managed conservatively.

Post-operatively, 9 (20%) patients required ICU admission, of which 5 (56%) had presented with perforation leading to generalised peritonitis. ICU admission was significantly associated with faecal intra-peritoneal contamination ($p=0.024$). The other 4 (44%) who required post-operative ICU stay were those who had presented with severe sepsis on arrival with stricture ($n=2$) and colovesical fistulae ($n=2$).

Fourteen (23%) patients who were known to have diverticular disease presented with fistulae in 6 (43%), strictures in 4 (29%) and abscess and generalised peritonitis in 2 (14%) patients each.

Initial conservative treatment was offered to 15 (25%) patients; 3 (20%) with intestinal obstruction, 11 (73%) undergoing per-cutaneous drainage of intra-abdominal abscess and one (7%) patient with colonic stricture who could not be operated upon because of multiple co-morbidities and high anticipated peri-operative and post-operative morbidity and mortality. Conservative treatment failed in 3 patients who were diagnosed with intra-abdominal abscess and eventually underwent surgery.

Overall, 45 (75%) patients underwent surgical intervention on initial presentation; of which 26 (58%) were emergency surgeries, while 19 (42%) successfully underwent elective surgery (Table-2 and 3). The indications for emergency surgery were; 20 (78%) patients with perforation leading to generalised peritonitis, 2 (4%) patients with severe sepsis secondary to intra-abdominal abscess, 2 (4%) each with colovesical fistula and stricture having multi-organ dysfunction on presentation. Types of surgeries performed in emergency were 12 (46%) Hartmann's procedures (11 with perforation leading to generalised peritonitis and 1 with intra-abdominal abscess), 7 (27%) resection and anastomosis (all 7 patients with perforation with minimal intra-peritoneal contamination), 6 (23%) diverting colostomy (2 each for patients with colovesical fistula, perforation leading to generalised peritonitis and stricture leading to multi-organ dysfunction) and 1 (4%) irrigation and drainage (intra-abdominal abscess).

The mean length of stay for those who underwent emergency surgery was 14.7 ± 4 days versus 12.3 ± 3 days for elective surgery. Post-operative ICU admission was required for 9 (19%) patients with mean length of stay being 13.3 ± 5 days. Mean duration of follow-up was 15.7 ± 9 months.

Overall post-operative morbidity was 40%; with 1 (6%) patient having developed stoma prolapse, 3 (16%) intra-

abdominal abscess, 7 (39%) incisional hernias, 2 (12%) surgical site infections, 4 (21%) developed wound dehiscence and 1 (6%) patient had an anastomotic leak. Three patients (6%) required re-exploration and 5 (10%) patients required re-admission.

Post-operatively, 7 (16%) patients expired within 30 days of surgery. Post-operative intra-abdominal abscess, wound dehiscence and incisional hernia had statistically significant association with preoperative generalised peritonitis ($p < 0.05$), while ICU admission was significantly associated with age over 60 years and diverticulitis with faecal peritonitis (Table-4).

Post-operative mortality had statistically significant association with high ASA score (III and IV) and age above 60 years (Table-5).

Discussion

Diverticular disease has been considered to be a disease of the Western civilization but it has reached the status of a modern day epidemic today in industrialised nations. The reported prevalence from different Asian countries are: 12% in Korea,¹³ 25% in Hong Kong,¹⁵ 19% in Singapore and 23% in Japan.¹⁶ Uncomplicated acute diverticulitis can be effectively managed conservatively on antibiotics and analgesia while giving the bowel some rest. Recurrence rates after successful medical treatment ranges from 5% to 62%.^{17,18} It has been suggested that 50% of recurrences occur within a year and 90% occur within 5 years of the index admission. It is also believed that recurrent attacks are less likely to respond to medical treatment and have a higher mortality rate. This has led the Standard Task Force of the American Society of Colon and Rectal Surgeons and the practice parameter committee of the American College of Gastroenterology to consider elective resection after the second attack of uncomplicated diverticulitis.

Three quarter of our patients had presented to ER which depicts the urgent need for treatment of these 19 of 26 patients (73%) who underwent emergency surgery had a high ASA (III or IV) which can be attributed to the delay in presentation (median 7 days). Ten out of 14 patients (71%) known to have the disease had presented to us with chronic form (fistula and stricture) of the disease, harbouring it for quite some time which had gone undiagnosed during its uncomplicated stage.

Post-operatively 3 patients (6%) required re-exploration; 1 patient with ASA-IV who had presented with perforation leading to faecal peritonitis underwent diverting colostomy suffered from stoma retraction and required a second surgery for refashioning of stoma; finally

succumbed to death due to multi organ failure. Three patients (3%) developed intra-abdominal abscess post-operatively, the occurrence of which was significantly associated with pre-operative generalised peritonitis ($p=0.01$) secondary to perforation of which 2 responded to percutaneous drainage, while 1 had to undergo a second laparotomy. Seven patients (15%) developed incisional hernia ($p=0.04$) and 4 developed wound dehiscence where the occurrence of both was significantly associated with generalised peritonitis ($p<0.05$). Two patients developed wound infection and required opening up of the skin staples followed by daily dressings allowing healing by secondary intention. One patient developed an anastomotic leak which occurred in a female operated for colovaginal fistula with a prior history of total abdominal hysterectomy and bilateral salpingo-oophorectomy for carcinoma of ovary and required re-exploration.

Being of retrospective nature, the study had its generic weaknesses, including missing information, a small sample size stretched over a span of 21 years and intra-operative findings with regard to the degree of intra-peritoneal contamination and assessment of wound being subjective.

According to our knowledge, this is the first study from Pakistan and reflects the increase in trend of the burden of disease over the years and its severity along with outcomes.

In this study the mean age of the population is in concordance with that of the Western data.¹⁹ Fourteen (23%) of the patients on presentation were known to have symptomatic diverticular disease which is high compared with that of western literature (6.2%).⁵ The literature from the Asian countries reports involvement of right colon in diverticular diseases²⁰ and nearly two-third of the patients undergoing emergency surgery for right-sided colon involvement. The present study results are surprisingly consistent with the Western literature, with majority of patients having left-sided bowel involvement. The proportion of resection and anastomosis in the present study group is lower when compared with other studies²⁰⁻²² and this could be explained because higher proportion of patients had ASA score of either III or IV due to delay in presentation leading to further derangements of physiological parameters secondary to peritonitis not allowing primary anastomosis.

Post-operative morbidity was 40% which according to the literature can reach up to 44%;⁵ one of the patients who suffered from stoma retraction had a high body mass index (BMI) which according to literature is a risk factor for

this complication.²³ The higher rate of post-operative intra-abdominal abscess can be explained by higher proportion of patients with preoperative faecal peritonitis and greater physiological derangements at the time of surgery. Our rate of re-exploration was comparable to other reported series in the literature.²³

Thirty-day post-operative mortality was 16% and comparable to reported series in the literature, which ranges from 1%-16.7%.⁷ The high rate of mortality can be explained by delay in presentation leading to greater physiological derangements and a greater proportion of patients presenting with generalised peritonitis. The occurrence of mortality was significantly associated with high ASA scores (III and IV) which again can be attributed to delayed presentation.

Conclusion

Complicated diverticulitis carries significant morbidity and mortality in Pakistani population; though these results cannot be generalized because of small number of patients spread over a large span of years. Since the trend is on the rise, prospective multi-centre cohort study is needed to understand the spectrum of disease and identification of risk factors to achieve the best possible outcome in patients who present with complicated diverticulitis. This also demands awareness for keeping high index of suspicion in patients presenting with Left Lower Quadrant pain, fever and leukocytosis for timely diagnosis and early referral to a tertiary care centre to achieve optimal results.

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