



Colonic diverticulitis in young Asians: a predominantly mild and right-sided disease

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Abstract

Background: The management of diverticulitis in young Asian patients remains challenging. This study aimed to highlight the issues of managing diverticulitis in young Asians.

Methods: A retrospective review of all patients who were admitted for acute colonic diverticulitis from October 2003 to December 2008 was performed. Patients who were ≤ 50 year old were considered 'young' and formed the study group.

Results: The study group consisted of 142 patients. The majority ($n = 126$, 88.7%) had right-sided diverticulitis and most ($n = 117$, 82.4%) were mild in severity. Most of the patients who underwent emergency surgery were for suspected appendicitis (39/56, 69.6%). When we compared between those aged ≤ 50 and > 50 years, the older group had worse diverticulitis (odds ratio (OR), 4.90, 95% confidence interval (CI), 2.00–11.99), been operated for indications other than suspected appendicitis (OR, 13.08, 95% CI, 5.42–31.56) and undergone a colectomy (OR, 9.96, 95% CI, 4.12–24.10). The younger group had a much higher incidence of right-sided disease (OR: 7.80, 95% CI: 4.32–14.07). Over a median follow-up of 40 (6–90) months, 7 (4.9%) patients were readmitted for a total of eight times for recurrent attacks of diverticulitis and all were successfully treated conservatively. Five other patients underwent elective surgery for persistent symptoms.

Conclusion: Diverticulitis in young Asians is often right-sided and mild in severity. A significant proportion is only diagnosed when operated for presumed appendicitis. Recurrent attacks are uncommon and can often be treated non-surgically.

Introduction

There have been a growing number of younger patients diagnosed with acute colonic diverticulitis over the past decade.¹ Controversy is still rife on the ideal management of diverticulitis in these patients. It was once thought that diverticulitis in young patients is often a more virulent pathology, and surgical intervention is recommended to prevent subsequent attacks.^{2,3} However, recent reports have supported adopting similar approaches in the management of these young patients much like their older counterparts.^{4,5} The incidences of recurrent attacks did not differ significantly between the two groups, and even when they do recur, they often respond to medical treatment.^{4,5}

In an Asian population, this issue presents frequently, but with no clear guidelines in its management. Its preponderance in the right

colon has been frequently reported.^{6–8} It is thus not uncommon for these patients to undergo an operation for suspected appendicitis due to a distinct lack of understanding of this condition.^{9,10} Henceforth, we performed this study to evaluate the severity, treatment and outcome of diverticulitis in young Asian patients in an attempt to better understand this disease.

Methods

Tan Tock Seng Hospital is a 1500-bed hospital, the second largest in Singapore, and provides acute and tertiary medical care to over 1.5 million people. A retrospective review of all admissions with the final diagnosis of acute colonic diverticulitis in the Department of General Surgery from October 2003 to December 2008 was performed. The diagnosis of diverticulitis was made based on either

intraoperative findings or computed tomography (CT) scans. In this study, right-sided diverticulitis was determined if the pathology arose anywhere from the caecum till the transverse colon.^{11,12} The severity of diverticulitis was assessed using the modified Hinchey's classification.^{13,14} In this study, all patients who were aged 50 years old and below were considered 'young' and formed the study group. The study protocol was reviewed and approved by our Institutional Ethics Committee.

In our institution, all patients with diagnosed acute diverticulitis would be admitted for intravenous antibiotics therapy and observation. The decision to perform a CT scan or an emergency surgery was made by the specialist surgeon on duty. Intravenous antibiotics therapy typically comprising of ceftriaxone and metronidazole was administered to all patients if there was no known allergy to these medications. If emergency surgery was performed, the type of surgical procedure was left at the discretion of the surgeon, with factors such as severity of pathology and haemodynamic stability of the patients being considered. Upon resolution of the symptoms, patients were discharged with a subsequent appointment in the outpatient clinic.

All patients were followed up in the outpatient clinic upon discharge and an elective colonoscopy or barium enema would be offered to each patient to confirm the underlying diagnosis. Elective surgery was reserved for patients with persistent symptoms. A recurrent attack was defined as the presence of acute diverticulitis on a repeat scan, which would invariably be associated with a repeat admission. The electronic records of all the patients were also reviewed to ensure that there were no patients who were admitted in another government-linked restructured hospital for the same condition subsequently.

Data analysis was performed using the Fisher's exact test for categorical variables with their odds ratio (OR) and 95% confidence interval (CI) reported. Continuous variables were analysed using the Mann-Whitney *U*-test. The logistic regression model was applied for the multivariate analysis. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) 17.0 (SPSS Inc., Chicago, IL, USA) and all *P*-values reported are two-sided, and *P*-values of <0.05 were considered statistically significant.

Results

During the study period, 339 patients were admitted for an episode of acute colonic diverticulitis. One hundred and forty-two patients were aged ≤ 50 years and formed the study group. There was a slight male ($n = 93$, 65.5%) predominance, and few patients had any underlying premorbid condition. Table 1 illustrates their demographic details.

A CT scan was performed in 95 (66.9%) patients. The majority ($n = 126$, 88.7%) of our patients had right-sided diverticulitis. Most ($n = 117$, 82.4%) had only mild diverticulitis (Hinchey Ia and Ib). Of all the patients ($n = 56$, 39.4%) who underwent emergency surgery, the majority were operated for suspected appendicitis ($n = 39$, 69.6%). Appendectomy alone was performed in 31 (55.4%) patients, while 22 (39.3%) underwent a colonic resection. There were three (5.4%) patients who underwent an appendectomy with diverticulectomy.

When we compared the variables between the ≤ 50 and > 50 years old groups, the differences were very apparent (Table 2). It was more likely for the older patients to undergo a CT scan (OR: 2.65; 95% CI: 1.58–4.45) and to have worse grades of diverticulitis (OR: 4.90; 95% CI: 2.00–11.99). In addition, the older group was more likely to be operated for indications than suspected appendicitis (OR: 13.08; 95% CI: 5.42–31.56). They were also more likely to have a colectomy performed (OR: 9.96; 95% CI: 4.12–24.10). On the other hand, the younger group had a much higher incidence of right-sided disease (OR: 7.80; 95% CI: 4.32–14.07) and this was the only variable that remained statistically significant after multivariate analysis.

All the patients in the study group were discharged well. Over a median follow-up of 40 (6–90) months, 7 (4.9%) patients were readmitted for a total of eight times for recurrent attacks of diverticulitis. These attacks occurred between 2 and 29 months from the initial admission. All were treated and discharged after a period of intravenous antibiotics. None of them underwent surgery. There were five other patients who underwent elective surgery following the initial admission. The indication was for persistent symptoms. Three of them managed to have their procedure performed laparoscopically. Table 3 illustrates the details of the follow-up of the study group.

Table 1 Characteristics of the 142 patients (aged ≤ 50 years old) with diverticulitis

	<i>n</i> (%)
Median age, range (years)	42 (16–50)
Male gender	93 (65.5)
Premorbid condition	
Hypertension	17 (12.0)
Diabetes mellitus	6 (4.2)
Hyperlipidaemia	5 (3.5)
Ischaemic heart disease	1 (0.7)
Computed tomography scan performed	95 (66.9)
Site of diverticulitis	
Right:	126 (88.7)
Caecum	88 (62.0)
Ascending colon	63 (44.4)
Hepatic flexure	3 (2.1)
Transverse colon	3 (2.1)
Left	16 (11.3)
Descending colon	5 (3.5)
Sigmoid colon	13 (9.2)
Diverticulitis	
Hinchey Ia	92 (64.8)
Hinchey Ib	25 (17.6)
Hinchey II	19 (13.4)
Hinchey III	4 (2.8)
Hinchey IV	2 (1.4)
Indication for emergency surgery ($n = 56$)	
Suspected appendicitis	39 (69.6)
Perforated diverticulitis	12 (21.4)
Failure of conservative treatment	4 (7.1)
Acute abdomen	1 (1.8)
Emergency procedure performed ($n = 56$)	
Appendectomy alone	31 (55.4)
Appendectomy with diverticulectomy	3 (5.4)
Right hemicolectomy	16 (28.6)
Sigmoid colectomy	5 (8.9)
Hartmann's procedure	1 (1.8)
Median length of stay, days (range)	3 (1–10)

Table 2 Univariate analysis of the various variables between the ≤50 and >50 years old groups

	Aged ≤ 50 (n = 142) (%)	Aged > 50 (n = 197) (%)	P-value	Odds ratio (95% confidence interval)
Gender				
Male	93 (65.5)	90 (45.7)	<0.001	2.26 (1.45–3.52)
Female	49 (34.5)	107 (54.3)		
Site of disease				
Right	126 (88.7)	99 (50.3)	<0.001†	7.80 (4.32–14.07)
Left	16 (11.3)	98 (49.7)		
Computed tomography scan				
No	47 (33.1)	31 (15.7)	<0.001	2.65 (1.58–4.45)
Yes	95 (66.9)	166 (84.3)		
Severity of diverticulitis				
Hinchey I–II	136 (95.8)	162 (82.2)	<0.001	4.90 (2.00–11.99)
Hinchey III–IV	6 (4.2)	35 (17.8)		
Emergency surgery performed	56 (39.4)	67 (34.0)	0.36	0.79 (0.51–1.24)
Indication for emergency surgery				
Suspected appendicitis	39 (69.6)	10 (14.9)	<0.001	13.08 (5.42–31.56)
Others	17 (30.4)	57 (85.1)		
Emergency procedure performed				
Appendectomy ± diverticulectomy	34 (60.7)	9 (13.4)	<0.001	9.96 (4.12–24.10)
Colonic resection	22 (39.3)	58 (86.6)		
Median length of stay, days (range)	3 (1–10)	4 (2–95)	<0.001	N/A

†Statistically significant on multivariate analysis. N/A, not applicable.

Table 3 Follow up details of the 142 patients (aged ≤ 50 year-old) with diverticulitis

	n (%)
Median duration of follow up, range (months)	40 (6–90)
Number of patients who developed recurrent attacks	7 (4.9)
Total number of readmissions	8 (5.6)
Median duration from discharge to readmission, range (months)	12 (2–29)
Number of patients who underwent elective surgery	5 (3.5)
Type of elective surgery	
Laparoscopic right hemicolectomy	3 (60.0)
Open right hemicolectomy	2 (40.0)
Indication for elective surgery	
Persistent symptoms	5 (100.0)

Discussion

Our series was able to highlight the numerous issues surrounding the management of acute diverticulitis in young Asian patients. The younger patients had milder grades of diverticulitis and predominantly right-sided disease. They were also more likely to be operated for suspected appendicitis. The combination of the disease's preponderance in the right colon, and the reluctance of performing CT scans in young patients, and the indoctrination of generations of surgeons that 'right lower quadrant pain in a young patient equates to appendicitis' perhaps vindicated our findings.^{7–12}

One of the reasons to explain the above is that most of the literature on diverticulitis was focused on the Western population, in which right-sided diverticulitis is rarely encountered.^{7–12} This information was then subsequently translated into modern textbooks and led to a lack of understanding of this disease. Recent reports from Asia have highlighted the epidemiological differences of diverticular disease between the two population groups.^{6–12} While

the development of right-sided diverticular disease has been attributed to genetic differences, the predisposing factors that result in the development of left-sided diverticulosis are remarkably similar to the Western population. The aging population, change in lifestyle, lower fibre intake have created a 'double whammy' phenomenon for Asians whereby not only are they exposed to the potential complications of right-sided diverticulosis when young, they are also not spared of the potential complications posed by left-sided diverticulosis as they age.¹⁵

Our series also lends support to the literature supporting the role of non-operative intervention in young patients if medically feasible. This is often determined by the severity of the diverticulitis. Fortunately, the majority of the patients had only mild diverticulitis, which usually responded to medical therapy. The risk of developing recurrent and/or more severe diverticulitis in young patients who were initially managed medically has been shown to be acceptable and comparable with the older patients.^{16,17} Even though less than 5% of our patients developed recurrent attacks of their diverticulitis, the short duration of follow-up may mask the actual disease progression. It is however impractical to continue to monitor these 'young' patients for their lifetimes as the underlying pathology is fundamentally benign, which essentially obviates the need for continual surveillance. The identification of factors that would predict recurrent and worse attacks would be helpful. This merits further work. That said, patients with repeated attacks may not necessarily warrant an operation as most can be treated medically. Thus, instead of regular surveillance which can be a significant drain to the available and limited health-care resources, education of these young patients is perhaps more vital to enable early detection and treatment should and when the disease recurs.

Unfortunately, the observations from our series only raised more issues that deserve to be addressed in future studies. There is the need to raise awareness of this disease entity and to adopt a mindset change especially when managing young Asian patients who present

with right-sided abdominal pain. Clinical predictors to differentiate between acute appendicitis and diverticulitis would be helpful. This then brings forth the next dilemma in the treatment algorithm: the role of imaging. While a CT scan can accurately determine the presence of diverticulitis, its benefits and drawbacks when compared with an unnecessary operation remain unanswered. No matter how minor the complications of appendectomy, it can be considerable to the individual patient. On the other hand, the lifelong impact of radiation from a CT scan in a young patient should not be dismissed lightly. Although ultrasonography and magnetic resonance imaging are alternative imaging modalities, their roles have not been clearly defined. These are perhaps more pertinent to young women who are pregnant or of child-bearing age. The authors also believed that women are more likely to undergo more radiological studies because of the real possibility of an underlying gynaecological aetiology, thereby reducing the incidence of unnecessary operations.

Another question that begs answering is what operation to perform when faced with an unexpected inflamed non-perforated colon. While some may argue that right colectomy can be definitive in curing the pathology, its potential complications are considerable.¹⁸ Appendectomy without colonic resection has also been advocated by some to negate the risk of developing appendicitis in the future as there may be a similar underlying aetiology that precipitated both entities.¹² The necessity and implications of a stoma following colonic resection when faced with a perforated left-sided pathology have already drawn its fair share of dispute and may be extrapolated to right-sided pathology.^{19–21} To make matter worse, recent reports have started to even question the optimal duration, the effectiveness of administering antibiotics and the need for hospitalisation in patients with acute diverticulitis.^{22,23}

There are considerable limitations in our study. Our study is not reflective of the true incidence and outcome of diverticulitis in an Asian population as we only analysed patients who were admitted and subsequently diagnosed with diverticulitis. It is impossible to subject all patients with abdominal pain to a CT scan or diagnostic laparoscopy to achieve the underlying diagnosis. Many other patients with mild diverticulitis could have been treated symptomatically without admission or a CT scan thereby creating a selection bias. Treatment bias was also inevitable in this retrospective study in which there was no set protocol and surgeons used their own discretion. The duration of follow-up could also have been longer.

Conclusions

Diverticulitis in young Asians is often right-sided and mild in severity. A significant proportion is only diagnosed when operated for presumed appendicitis. Recurrent attacks are uncommon and can often be treated non-surgically.

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