

# DIVERTICULAR DISEASE IN THE YOUNG AGE GROUP – CLINICAL COURSE AND MANAGEMENT

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## Research article

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# Abstract

Diverticular disease is a common disease which is classically described in the elderly. However, recently its incidence in young patients is being reported more frequently. It has a wide spectrum of presentations ranging from asymptomatic diverticulosis to life-threatening forms. Classically, the diverticular disease in the young was considered a more virulent form with a higher recurrence rate necessitating more surgical interventions however, this old notion has been recently challenged. The aim is to study the clinical course of diverticular disease in the young age group < 50 years to evaluate the differences related to the predisposing risk factors, presentation, severity, complications, recurrence rate, and the management.

**Methods:** A retrospective study of the patients admitted with diverticular disease in King Hamad University Hospital from 2016 to 2019. Patients were divided into 2 groups; group I (Young, <50) and group II (Old,  $\geq 50$ ). A comparison was held between the two groups according to the proposed risk factors, predictors of severity, the clinical, and the way of management. Different variables were analyzed using the appropriate statistical tests. Statistical significance was taken as  $P < 0.05$ . Results 134 patients were included; 76 (56.7%) males and 58 (43.3%) females. The median age was 59.5 (Min. – Max.) (25 – 89), Mean  $\pm$  SD.  $58.2 \pm 13.5$ . 115 (85.8%) patients presented with diverticulitis and 19 (14.2%) with diverticular bleeding. There was male predominance in the young group,  $p = 0.006$ . The old group showed a higher prevalence of DM, HTN and dyslipidemia,  $p = < 0.001$  for all. Moreover, the old group showed lower haemoglobin and vitamin D levels with higher steroids intake,  $p = < 0.001$ ,  $0.001$  and  $0.004$  respectively. There was no significant difference related to disease severity, management setting, antibiotics prescription, guided drainage, laparoscopic lavage or the need for surgery. However, recurrence was significantly higher in the young group,  $p = 0.046$ .

**Conclusion:** Diverticular disease in the young age group under 50 is more predominant in males with a higher rate of recurrence. However, it is not a severe form of the disease and can be managed the same way as in the elderly.

## Introduction

### LIMITATIONS OF THE STUDY

- The retrospective nature of the study.
- The relatively small sample size.
- The small number of patients presented with bleeding.

### STRENGTHS OF THE STUDY

- The adequate follow up period for most of the patients.
- The comparative design of the study between the two groups.

Diverticular disease is a common disease which is classically described to have an age-dependent distribution; with its incidence rising with age up to 60% in individuals over 70 years of age (1-3).

However, recent studies revealed that, the incidence of diverticular disease in the young age group under 50 years of age ranges from 18% to more than 30% (4–8).

Classically, diverticular disease in the young age group was considered a more virulent form of the disease with a higher recurrence rate, necessitating more surgical interventions than in the elder counterparts (13-15).

However, this concept is being challenged recently. Many studies concluded that younger age at presentation with diverticular disease is not correlated with more severe forms, development of complications or the need for a more aggressive approach of management (16-18).

The aim is to study the clinical course of diverticular disease in the young age group < 50 years of age in comparison to those 50 years or elder, to evaluate the differences in predisposing risk factors, presentation, severity, complications, recurrence rate, and the way of management.

Accordingly, diverticular disease is no longer considered a disease of the elderly. (9, 10)

Diverticular disease has a wide spectrum of presentations with its most benign form being asymptomatic diverticulosis discovered incidentally on imaging or colonoscopy. However, 10% – 35% will have symptomatic disease. Fortunately, 85–90% of them will develop symptomatic uncomplicated diverticular disease, while 10–15% will develop acute diverticulitis, with or without complications including abscesses, fistulae, perforation or bleeding (11, 12).

## Methods

A retrospective cohort study was conducted of the patients admitted with the diagnosis of diverticular disease in King Hamad University Hospital from 2016 to 2019. We targeted the first attack of symptomatic diverticular disease. Patients were divided into 2 groups; group I (Young, <50 years) and group II (Old, 50 years or more). Comparison was held between the two groups according to the demographic data like age and gender, comorbidities, proposed risk factors (alcohol, smoking and BMI), proposed predictors of disease severity (laboratory values including HGB, WBC, CRP, Vit D), and the use of NSAIDs, ASA, and corticosteroids.

Moreover, a comparison of the clinical course was done relevant to the nature of the presentation, presence of fever, the extent of the disease (site and stage), recurrence and the presence of complications. Additionally, the way of management whether conservative or surgical was studied and compared between the two groups.

Disease severity was categorized according to Sallinen VJ et al. (19) classification for the purpose of comparing the severity of the disease between the two groups.

Data management and analysis plan: Different variables were analyzed using the appropriate statistical tests. Statistical significance was taken as  $P < 0.05$ . The data was analyzed using SPSS version 22 and

## PATIENT AND PUBLIC INVOLVEMENT STATEMENT

Due to the retrospective nature of the study there was no direct patient participation in the study design and conduction.

## Results

Our database included 189 patients who were diagnosed with diverticular disease. However, 55 patients were excluded due to a diagnosis of the first episode outside the hospital, incomplete medical records or loss of follow up (Fig 1 Study flowchart). Accordingly, 134 patients were included in the study; 76 (56.7%) males and 58 (43.3%) females. The median age was 59.5 (Min. – Max.) (25 – 89), Mean  $\pm$  SD. 58.2  $\pm$  13.5. 115 (85.8%) patients presented with diverticulitis and 19 (14.2%) with diverticular bleeding. Group I (young) included 29 patients while Group II (old) included 105 patients.

Comparison of the two groups (Table 1) revealed a gender predilection with male predominance in the young age group with 23 (79.3%) males and 6 (20.7%) females affected. However, in the old group, there was no clear gender preponderance with 53 (50.5%) males and 52 (49.5%) females.

The difference was statistically significant  $p = 0.006$ . There was no significant difference regarding nature of presentation whether diverticulitis or diverticular bleeding  $p = 0.365$ .

Regarding the extent of colon involvement, the younger age group tended to show more right-side involvement, while the older age group showed more pancolonic distribution however, the difference came under statistical significance. Looking at the comorbidities in both groups there was a significantly higher prevalence of DM, HTN and dyslipidemia in the older age group.  $P = < 0.001$  for all the three. Review of laboratory data at presentation showed lower haemoglobin and vitamin D levels in the older age group,  $p = < 0.001$  and  $0.001$  respectively with no significant difference of the inflammatory markers including WBC and CRP,  $p = 0.750$  and  $0.955$ . Among the risk factors studied only steroids intake was higher in the old age group,  $p = 0.004$ .

Comparison of the clinical course and severity was done (Table 2). Within the 115-patient presented with diverticulitis, there were 27 belonging to group I and 88 from the old age group. Comparison of severity according to Salinen stage revealed no significant difference between both groups. Likewise, comparison of the management of both groups relevant to management setting (outpatient or inpatient), antibiotics prescription, guided drainage, laparoscopic lavage and the need for surgery, all showed no significant difference,  $p = 0.447$ ,  $0.640$ ,  $1.000$ ,  $0.296$  and  $0.523$ .

Analysis of the outcome parameters revealed a bit longer hospital stay in the older age group relative to the young group with a median (Min. – Max.) of 5 (1 – 33) and 5 (2 – 10) and mean  $\pm$  SD of  $7.1 \pm 7$  and  $4.5 \pm 2.6$  respectively, however, the difference was insignificant  $p = 0.442$ . Recurrence was significantly higher in the young group 41.4% versus 22.9% in the older group,  $p = 0.046$ .

Table (1): Comparison between the two studied groups according to different parameters

	Group I - Young (<50) (n = 29)	Group II - Old (≥50) (n = 105)		
<b>Gender</b>				
Male	23 (79.3%)	53 (50.5%)	$\chi^2=7.696^*$	0.006*
Female	6 (20.7%)	52 (49.5%)		
<b>Follow up (months)</b>				
Median (Min. – Max.)	18.0 (12 – 27)	18.0 (11 – 32)	U= 1509.5	0.944
Mean ± SD.	18.4 ± 4.5	18.6 ± 5.2		
<b>Fever</b>	7 (24.1%)	28 (26.7%)	$\chi^2=0.075$	0.784
<b>Presentation</b>				
Diverticulitis	27(93.1%)	88(83.8%)	$\chi^2=1.613$	0.365
Bleeding	2(6.9%)	17(16.2%)		
<b>Extent</b>				
Left	20 (69%)	70 (66.7%)	$\chi^2=0.054$	0.815
Right	7 (24.1%)	11 (10.5%)	$\chi^2=3.647$	0.069
Pancolic	2 (6.9%)	24 (22.9%)	$\chi^2=3.702$	0.054
<b>Tobacco</b>	7 (24.1%)	32 (30.5%)	$\chi^2=0.442$	0.506
<b>Alcohol</b>	7 (24.1%)	11 (10.5%)	$\chi^2=3.647$	0.069
<b>BMI</b>				
Median (Min. – Max.)	30.7(19.2 – 51)	30.6(20.3 – 51.1)	t= 0.607	0.545
Mean ± SD.	30.5 ± 6.4	31.3 ± 6.2		
<b>DM</b>	4 (13.8%)	64 (61%)	$\chi^2=20.220^*$	>0.001*
<b>HTN</b>	7 (24.1%)	69 (65.7%)	$\chi^2=16.001^*$	>0.001*
<b>CKD</b>	1 (3.4%)	6 (5.7%)	$\chi^2=0.236$	1.000
<b>Hypothyroidism</b>	1 (3.4%)	6 (5.7%)	$\chi^2=0.236$	1.000
<b>Dyslipidemia</b>	3 (10.3%)	59 (56.2%)	$\chi^2=19.212^*$	>0.001*
<b>IBD</b>	0 (0%)	0 (0%)	-	-
<b>HGB</b>				
Median (Min. – Max.)	14.9 (7.9 – 17)	13.0 (5.5 – 16)	t= 3.899*	>0.001*
Mean ± SD.	14.3 ± 2	12.6 ± 2		
<b>WBCs</b>				
Median (Min. – Max.)	9.9 (4.6 – 18)	10.0 (3.3 – 41.4)	U= 1463.50	0.750
Mean ± SD.	10.7 ± 3.5	11.4 ± 6.6		
<b>CRP</b>				
Median (Min. – Max.)	21.0 (0.6 – 178)	15.0 (0.8 – 272.5)	U= 1512.0	0.955
Mean ± SD.	41.0 ± 48.1	49.7 ± 64.9		
<b>Vit D</b>				
Normal	29 (100%)	76 (72.4%)	$\chi^2=10.222^*$	0.001*
Low	0 (0%)	29 (27.6%)		
<b>NSAIDs</b>	1 (3.4%)	14 (13.3%)	$\chi^2=2.234$	0.190
<b>ASA</b>	3 (10.3%)	25 (23.8%)	$\chi^2=2.492$	0.114
<b>Antithrombotic</b>	1 (3.4%)	10 (9.5%)	$\chi^2=1.113$	0.455
<b>Steroids</b>	0 (0%)	3(75%)	$\chi^2=13.359^*$	0.004*

$\chi^2$ : Chi square test t: Student t-test

U: Mann Whitney test

p: p value for comparing between the two studied groups

\*: Statistically significant at  $p \leq 0.05$

Table (2): Comparison of the clinical course and severity of disease process between the two groups

	Young group Old group			
	(<50)	(≥50)		
<b>Salinnen stage</b>	<b>(n= 27)</b>	<b>(n= 88)</b>		
1	21 (77.8%)	56 (63.6%)	$\chi^2=1.867$	0.172
2 – 3	6 (22.2%)	24 (27.3%)	$\chi^2=0.273$	0.601
4 – 5	0 (0%)	8 (9.1%)	$\chi^2=2.638$	0.195
<b>Inpatient/Outpatient</b>	<b>(n = 29)</b>	<b>(n = 105)</b>		
Inpatient	18(62.1%)	73(69.5%)	$\chi^2=0.580$	0.447
Outpatient	11(37.9%)	32(30.5%)		
<b>Antibiotics</b>	16 (55.2%)	63 (60 %)	$\chi^2=0.219$	0.640
<b>Guided drainage</b>	3 (10.3%)	11 (10.5%)	$\chi^2=0.0$	1.000
<b>Lap Lavage</b>	2 (6.9%)	3 (2.9%)	$\chi^2=1.032$	0.296
<b>Surgery</b>	2 (6.9%)	13(12.4%)	$\chi^2=0.688$	0.523
<b>Type of surgery</b>	<b>(n = 29)</b>	<b>(n = 105)</b>		
No	28(96.6%)	92(87.6%)	$\chi^2=1.833$	0.449
Hartmann's procedure	1(3.4%)	12(11.4%)		
Total colectomy	0(0%)	1(1%)		
<b>Hospital stay (days)</b>	<b>(n = 29)</b>	<b>(n = 105)</b>		
No	10 (34.5%)	33 (31.4%)	$\chi^2=0.097$	0.755
Yes	19 (65.5%)	72 (68.6%)		
Median (Min. – Max.)	5 (2 – 10)	5(1 – 33)	U= 606.5	0.442
Mean ± SD.	4.5 ± 2.6	7.1 ± 7		
<b>Recurrence</b>	12 (41.4%)	24 (22.9%)	$\chi^2=3.968^*$	0.046*

$\chi^2$ : Chi square test U: Mann Whitney test p: p value for comparing between the studied groups

\*: Statistically significant at  $p \leq 0.05$

## Discussion

The incidence of diverticular disease is growing among the young individuals producing a shift in the old perception which marks the disease as a disorder of the elderly population. (20-22). Consequently, the natural history of the disease in the young has become a focus of research.

Our study showed that 21.6 % of patients were younger than 50 years of age with a male predominance in the younger age group. These findings go with the findings of Pisanu A et al, and others (5, 23) reporting a male predominance in the young patients with diverticular disease. Moreover, the incidence in our study (21.6 %) came within the reported range in other literature (4-8).

Tan KK et al, (17) reported that diverticulitis in young Asian patients is often right-sided and mild in severity. Our cohort of young patients showed more right-side involvement compared to the elder counterparts, however the figures came under statistical significance.

Evaluation of the risk factors showed a significantly higher prevalence of diabetes, hypertension and dyslipidemia in the old age group. This could be explained by the nature of these comorbidities as age-related diseases.

The severity of diverticulitis was assessed using Salinnen staging, (19) which is a classification based on clinical, radiologic and physiologic parameters.

It includes 5 stages:

- Stage 1 Uncomplicated diverticulitis
- Stage 2 Complicated diverticulitis with small abscess (<6 cm)
- Stage 3 Complicated diverticulitis with large abscess ( $\geq 6$  cm) or distant intraperitoneal or retroperitoneal air
- Stage 4 Generalized peritonitis without organ dysfunction
- Stage 5 Generalized peritonitis with organ dysfunction

Comparison of severity revealed no significant difference between the two groups however, it is noticed that the older age group comprised all the patients with late stages 4 and 5. Additionally, all the management parameters studied showed comparable results between the two groups regarding the setting of management (inpatient or outpatient), length of hospital stay, the need for surgery, antibiotics prescription and other interventions like laparoscopic lavage or image-guided drainage. These findings refute the old theories which consider diverticulitis in the young population a malignant form of the disease.

Similar conclusions were made by Ritz JP et al, (24) on the assessment of the clinical outcome of 1019 patients with acute diverticulitis. Ünlü et al. (25) and others (26) also reported that younger age is neither associated with a more severe presentation of diverticulitis nor with a higher incidence in recurrence. However, in our study the young age group showed more recurrence compared to the old group, this could be attributed to a chronological influence than a more virulent pathology (27).

## Conclusion

- Diverticular disease in the young age group under 50 is more predominant in males.
- Diverticular disease in the young population is not a severe form of the disease and can be managed the same way as in the elderly.
- Recurrence of diverticular disease is more in young patients.

## Declarations

### CONFLICT OF INTEREST STATEMENT

None declared.

## FUNDING

There is no financial support from any source.

## ETHICAL APPROVAL

Approved by Research and Ethics Committee, King Hamad University Hospital, Ref. KHUH/ Research/No. 281/2019

## AUTHORS CONTRIBUTION

- 1: Idea, study design, literature review, results presentation and discussion
- 2: Supervision of the research project
- 3: Data collection and statistical analysis
- 4: Data collection

## DATA SHARING STATEMENT

- Data are available upon reasonable request from the corresponding author

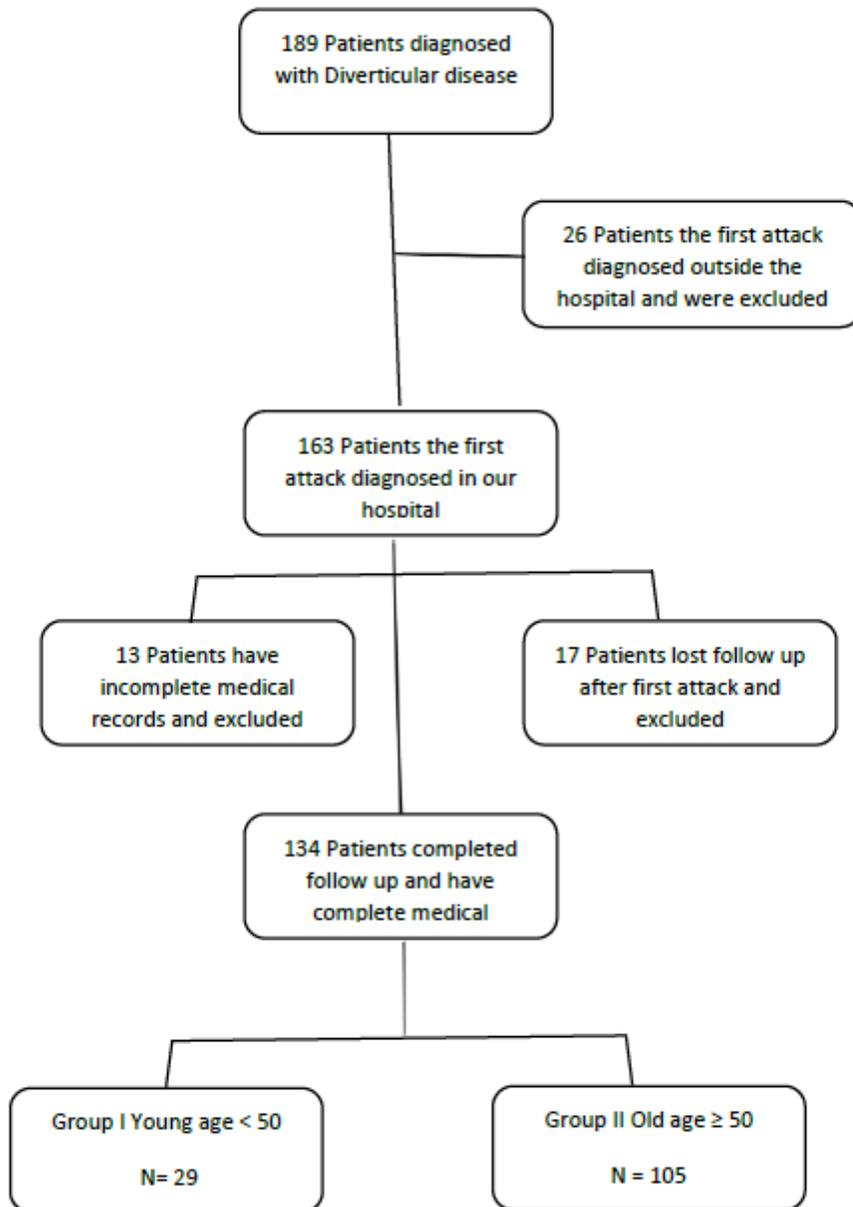
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## Figures



**Figure 1**

Study flowchart

## Supplementary Files

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