

## Diverticulitis in the Young Population : Reconsidering Conventional Recommendations

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### Abstract

**Background :** In the past diverticulitis was believed to be uncommon in the young population. However, there is growing concern suggesting that these patients develop more severe clinical symptoms and may require more frequent intervention.

**Methods :** We performed a retrospective chart review of patients with diverticulitis in individuals with age less than 40 years over an 8 year period (2007-2015). Diagnosis was confirmed with a CT scan. In addition to age we took into consideration race, gender, anemia (hematocrit < 41), leukocytosis (WBC > 12), BMI and whether it was an initial episode or recurrence. Our outcome variables were complications (abscess, fistula, and perforation, results of colonoscopy (polyps or colon cancer)) and whether the patient required surgery.

**Results :** We identified 123 patients who were less than 40 years old with the diagnosis of diverticulitis. There was greater than a 3:1 ratio of males to females (77% males and 23% females) with an average age of 32.6 year. The race of the patients was nearly entirely Hispanic (88.6%). With regards to the outcome variables, 18.7% had abscesses as a complication. Perforations were observed in 26% of the patients, of which one was complicated by a fistula. A total of 25 (20%) patients went to surgery. Of these, 21 had an abscess, perforation, or tubular adenomatous polyps (TAP). Follow-up colonoscopy post-diverticulitis results were available for 42 patients. Of those patients, 9 had hyperplastic polyps and 3 had TAP. The remaining 30 patients had no polyps. No colon cancer or villous polyps were found in the entire cohort.

**Conclusion :** Our study highlights that young patients who have an index case of uncomplicated diverticulitis with no other risk factors or complications may not gain further benefit from routine colonoscopy as once traditionally thought. (*Acta gastroenterol. belg.*, 2016, 79, 435-439).

**Key words :** diverticulitis, young.

### Introduction

The conventional thinking about diverticular disease has typically affected patients who are older, specifically those older than 60 years of age (1). The belief is that most cases are usually secondary to a decrease in fiber consumption, increased meat consumption, and lifestyle habits (e.g. smoking) (2,3). Depending on the severity of the illness it can place a significant financial strain on the healthcare system (4,5). Although the majority of cases that are admitted for diverticulitis remain asymptomatic, approximately 33% of patients will experience manifestations of diverticulitis and its complications (1,6).

Given the recent observation of increased cases in young patients (1,5,7-9), there have been questions regarding the severity of the disease in this population.

When attempting to address the reasons for increased incidence of diverticular disease in the young population, there have been studies alluding to obesity as a risk factor for diverticulitis and its complications (10-12). It is now apparent that there is conflicting data as to the severity of the disease in the young population. There have been studies showing possible increased virulence in the young population (2,4,13). However, there are other studies that question the aggressiveness of the disease in the younger population (14-16). The purpose of our study was to examine the presentation of diverticulitis at our institution in regards to the young patient population and if they have substantial findings on surveillance colonoscopy after an episode of diverticulitis.

### Methods

#### Study Design

A single-centered, retrospective analysis was performed between the years of 2007 and 2015 of patients who were admitted to either medical or surgical service with the diagnosis of diverticulitis. This study was conducted at a major hospital center in one of the most diverse communities in the United States, providing a cultural and epidemiologically significant advantage. An approved chart analysis using QuadraMed Computerized Patient Record (QCPR) was retrospectively accessed with data-input and calculations formulated in a computerized software. This study has been approved by the Institutional Review Board of the Mount Sinai School of Medicine.

#### Selection Criteria

This study was a retrospective review of 123 medical records from 2007-2015 to identifying patients admitted to either medical or surgical service with the diagnosis

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of diverticulitis. Inclusion criteria included diagnosis of diverticulitis as confirmed by radiographic (Computed Tomography) findings consistent with the disease and age  $\leq 40$  years old.

#### Statistical analysis

Statistical significance was determined using a two-tailed Fisher's exact test. A P value of less than 0.05 was considered to be statistically significant.

## Results

#### Demographics

We identified 123 patients who were equal to or less than 40 years old with a diagnosis of diverticulitis that was confirmed using CT. There were greater than 3:1 ratio of males to females (77% males and 23% females) with an average age of 32.6 years. See figure 1. The race of the patients was nearly entirely Hispanic (88.5%), followed by Asian (9%), African-American (1.5%) and Caucasian (1%). There were no significant differences between the sexes or ethnic groups with respect to age.

#### Clinical Characteristics

Anemia was present in 48 patients (39%) and more common in females (82%). Leukocytosis was present in 78 (63%) patients. With regards to the outcome variables, 23 (18.7%) patients had abscesses as a complication. There were 32 (26%) perforations, of which one was complicated by a fistula. Perforations were more common in males (29%) than females (14%) (one-tailed  $p=0.08$ ). See Figure 2. A total of 25 (20%) patients went to surgery. Of these, 21 had an abscess, perforation, or tubular adenomatous polyps (TAP). Surgery was performed entirely in the Hispanic population whereas no other patients required such intervention (one-tailed  $p=0.04$ ). Among 123 patients with diverticulitis, 12 patients (10%) had body mass index (BMI)  $< 25$  kg/m<sup>2</sup>, 47 patients (38%) had BMI 25-29 kg/m<sup>2</sup> and 64 patients (52%) had BMI  $\geq 30$  kg/m<sup>2</sup>. When considering the BMI

of the cohort with respect to the complication rate, it was found that 8% (1/12) of patients with a BMI  $< 25$  kg/m<sup>2</sup> developed a complication. Additionally, 19% (9/47) of patients with a BMI 25-29 kg/m<sup>2</sup> and 28% (18/64) of patients with BMI  $\geq 30$  kg/m<sup>2</sup> also experienced some degree of complication. Risk of complications in patients with BMI  $\geq 30$  kg/m<sup>2</sup> was found to be higher than patients with BMI  $< 30$  kg/m<sup>2</sup> but this result did not achieve statistical significance (OR: 1.9, 95%CI: 0.8-4.5,  $p=0.1$ ). The recurrence rate in our cohort was 23/123 (19%). The recurrence rate did not differ between patients with BMI  $< 30$  versus BMI  $\geq 30$  kg/m<sup>2</sup> ( $p=0.6$ ).

#### Colonoscopy Findings

Follow-up colonoscopy results post-diverticulitis were available for 42 patients (Figure 2). Of those patients, 9 had hyperplastic polyps and 3 had TAP. Two of the TAP were in the transverse colon measuring between 0.15 and 0.2 cm while the third was in the ascending colon and measured 0.4 cm. The remaining 30 patients had no polyps. No colon cancer or villous polyps were found in the entire cohort. See Figure 3. See Table 1 for a summary of the clinical characteristics of our cohort.

## Discussion

Previously established guidelines recommend that all patients presenting with an acute episode of diverticulitis should undergo a colonoscopy approximately 4-6 weeks after clinical resolution to rule out colorectal cancer (CRC) regardless of patient age (17-19). However, these studies were performed before the routine use of CT studies to reliably confirm the diagnosis. The precise mechanism as to how diverticulitis may potentially evolve into colon cancer remains unknown. One theory postulates that the carcinogenic component of our feces that is generated by bacteria may get trapped within the diverticulum resulting in chronic inflammation, which over a period of time becomes carcinogenic (20).

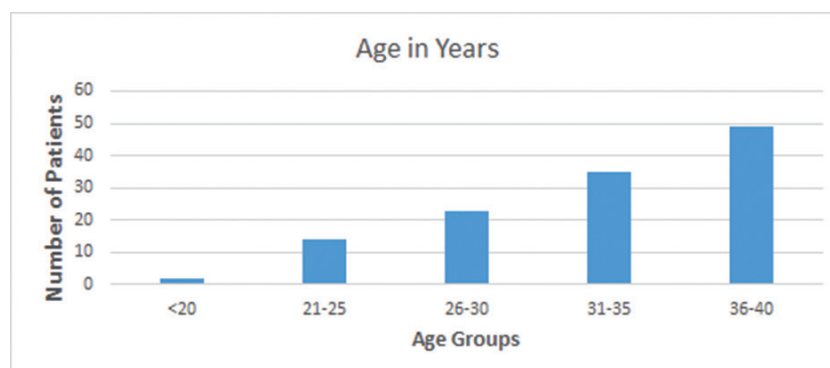


Fig. 1. — Age Distribution of young patients with diverticulitis

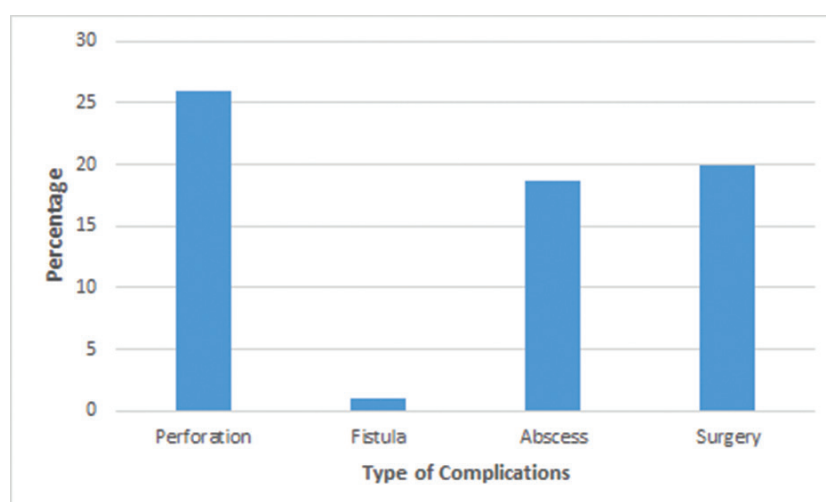


Fig. 2. — Perforation most common complication and almost twice as more common in males than females. All surgical patients were of Hispanic ethnicity.

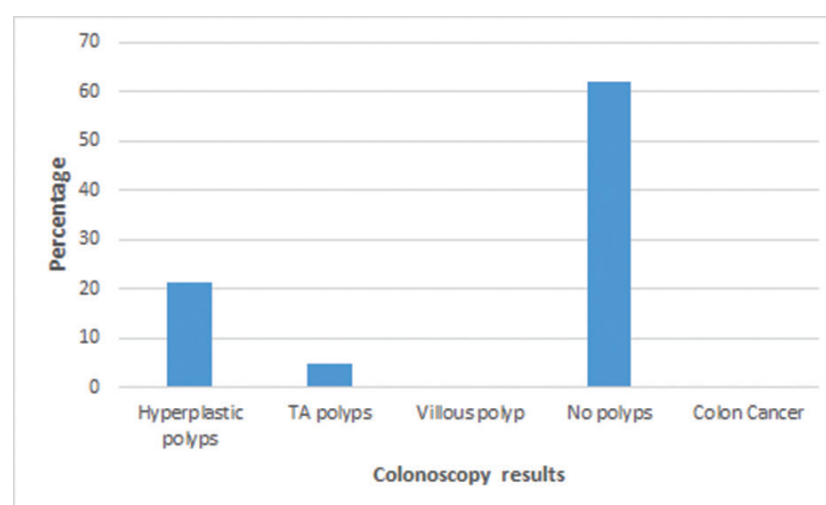


Fig. 3. — Results were significant for low yield of polyps and more importantly, no cases of CRC.

One of the baseline characteristics we evaluated in this study was the BMI of the patients. Specifically, we found that 52% of patients had a BMI > 30 and consequently were at a higher risk for complications compared to the remainder of the cohort although statistical significance was not achieved. Schauer et al looked closely at the BMI in their population of young men who had complications from diverticular disease and found that 82% (50/61) of these patients were obese (10). Taken together, this may indicate the role of obesity as a possible factor in developing diverticular complications.

Our study specifically evaluated the young population with respect to any findings on colonoscopy for mainly left-sided diverticulitis. Of the patients who underwent colonoscopy, 9 had hyperplastic polyps and 3 had tubular adenomatous polyps. The remaining 32 patients had no polyps and no colon cancer or villous polyps were found

in the entire cohort. We have highlighted that routine colonoscopy may not be indicated after the first episode of uncomplicated diverticulitis in young individuals with no other risk factors and/or complications.

When considering the complications rates from diverticulitis in our cohort, we have found some similarities when compared to the literature. Specifically, Freischlag et al observed a perforation rate of 26%, a fistula rate of 6%, and a local abscess rate of 53% (7). Our findings of a 26% perforation rate mirror those findings. However, the fistula rate (<1%) and abscess rate (~19%) were substantially lower in our cohort.

Furthermore, Shah et al observed a 38% complication rate with perforations (62%) being the most common (12). Freischlag et al also observed a rate of urgent surgery in their cohort for complications of 88% (15/17) versus 42% (17/41) in those age >40 and attributed obtaining excellent results during surgery by maintaining

Table 1. — Clinical characteristics of study cohort

| Clinical characteristics of study cohort: |                        |
|---|------------------------|
| Total number of patient                   | 123 patients           |
| Average age                               | 32.6 years             |
| Male/Female                               | 3:1                    |
| Race                                      | 88.5% Hispanic         |
| BMI (Average)                             | 30.6 kg/m <sup>2</sup> |
| Colonoscopy                               | 34.1%                  |
| - Hyperplastic polyps                     | 9/42 (21.4%)           |
| - TAP polyps                              | 3/42 (7.1%)            |
| Surgery                                   | 25 (20.3%)             |
| - Abscess                                 | 9/42 (21.4%)           |
| - Perforation                             | 14/42 (33.3%)          |

a high clinical index of suspicion (7). Our population only observed 20% of the patients undergoing surgical intervention.

In regards to the clinical guideline recommendation of performing a colonoscopy after a case of diverticulitis, there are recent studies that show in the setting of an otherwise uneventful clinical course an endoscopic evaluation may not be necessary. Alexandersson et al showed in an adult study (average age 58) of 288 patients with a follow up colonoscopy in 199 patients that only two patients had colorectal cancer (0.7%) and only 1/33 of the colonic polyps were > 1 cm in size (21). There have been other previous studies that indicate an increased risk of CRC after an episode of diverticulitis (20, 22). A recent study, however, found that there was no increased risk of CRC after an episode of uncomplicated diverticulitis (23). A recent systematic review looking at rates of CRC and advanced adenomas in patients presenting with uncomplicated diverticulitis found that they were equal or in some evaluations less than rates encountered in asymptomatic individuals (24). The key finding of this review was that approximately 1% of CRC cases were found in colonoscopies performed after an episode of uncomplicated diverticulitis (24). Sai et al also found similar results in their meta-analysis review of adult patients with diverticulitis with an estimated 2% rate of CRC (25). However, the review utilized surgery and barium enema as a diagnostic tool in addition to colonoscopy.

To our knowledge, this is the first study to evaluate the need for colonoscopy post-diverticulitis episode in young patients. Much of the data that we have at the present time is based on patients greater than the age of 40. However, given the amount of data present at this time to consider forgoing colonoscopy in adults with uncomplicated diverticulitis and further extrapolating that idea to the young population would be prudent given the results we have from our study in addition to the findings from prior studies. Follow up colonoscopy for complicated diverticulitis may be beneficial. By properly classifying the patient, it may lead to less patient burden and any adverse effects that may result from undergoing

endoscopic evaluation. Additionally, it can help to curb healthcare costs.

Our study had some limitations. First, it is limited by its retrospective design and caution should be exercised when interpreting the data. Second, not all patients in the study population underwent a colonoscopy, which may have misrepresented the actual prevalence of colonic neoplasia. Third, we only included patients who were properly coded for diverticulitis. There may be situations where a patient is not coded appropriately for acute diverticulitis and was therefore not included in the study. However if these patients were coded for something similar (i.e. colonic mass, possible neoplasm) they would undergo endoscopic evaluation regardless. A longitudinal study that can project the long-term outcomes in the young population will be useful in determining the benefit that we assume from endoscopic evaluation.

In conclusion, young patients who have an index case of uncomplicated diverticulitis with no other risk factors or complications may not gain further benefit from routine colonoscopy as once traditionally thought.

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