Diverticulosis of the Colon in an Ambulatory Care Practice: A Large Retrospective Study Looking at Incidence

ABSTRACT

Background
The incidence of diverticulosis in the United States has not been evaluated in a large-scale healthy population.

Aims
To describe the incidence and trends of change in patients with diverticulosis in an outpatient endoscopy center.

Methods
A retrospective study gathered information from a computer database between 2002 and 2010. ICD-9 codes were used to determine the incidence of diverticulosis through colonoscopies. 37616 patients underwent colonoscopy; 32446 were healthy screening colonoscopies and 5160 were colonoscopies for gastrointestinal related complaints. Demographic trends based on age ranging from 1 to 99, gender and the incidence of diverticulosis over time and distribution were obtained.

Results
The overall incidence of diverticulosis was 34.82%. There was no difference noted between men and women. Diverticulosis was noted in patients of all ages with a trend toward increasing numbers with age.

Conclusions
The incidence of diverticulosis is 34.82% which increased since last evaluated in the United States in the 1950s.

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INTRODUCTION

Dr. Fleischman first coined the term “divertikel” in 1815 but it was not fully understood until the 1920s. Diverticulosis has since become the most common disease of the colon in western countries in primarily elderly populations. The presence of diverticula in the colon is associated with multiple complications such as infection, bleeding and perforation. If infection or diverticulitis does occur, up to 25% of people may develop life-threatening problems costing about 5.3% of the annual general surgery budget and causing 6% of in-patient mortality and 26% peri-operative mortality.

Despite this, the incidence of diverticulosis is difficult to assess in asymptomatic patients (up to 80%) and thus has not been assessed in the United States since 1959. Screening colonoscopies offer an opportunity to evaluate the incidence of diverticulosis in healthy individuals in an ambulatory setting. There were no patients in this study who had connective tissue disorders such as Ehlers Danlos or Marfans, which may cause diverticular disease to occur at a younger age secondary to a weakened colonic wall. This study aims to look at the incidence of diverticulosis in a retrospective study through a single center outpatient endoscopy clinic. This is the largest study to date, to identify the incidence of diverticulosis particularly in an outpatient setting.

Methods and Materials

This is a retrospective study completed at Arapahoe Gastroenterology in Littleton, Colorado. This is a single center outpatient endoscopy clinic, in operation since 2002. ProVationMD, an onsite computer generated medical record system is used by physicians to input patient information immediately following procedures which ensures uniform data collection. It has been used exclusively since the date of opening in 2002 until completion of this study on December 3, 2010. A total of 37616 patients were evaluated; each patient had their outpatient colonoscopy completed by one of eight board certified gastroenterologists. Each gastroenterologist working in the center had performed over 3000 colonoscopies before being hired by the clinic. Colons were prepared for the procedure using MoviPrep®, HalfLytely® or NuLytely®. The Olympus CFQ180AL or the PCFQ180AL colonoscopes were used. Propofol or Versed and Fentanyl were used for conscious sedation. Indication for colonoscopy in the clinic varies with 86.26% of patients presenting for screening purposes and 13.72% for specific gastrointestinal complaints. Of the patient who underwent colonoscopy, 13099 (34.82%) were recorded as being diagnosed with diverticulosis. There were a total of 6768 males and 6331 females. The most common site of diverticula was the sigmoid and descending colon (Table 1). 1792 patients had to be excluded from the study because gender or age was not recorded in the filed information.

RESULTS

Diverticulosis of the colon was found in 13099 patients out of 37616 total colonoscopies performed for a total of 34.82%. There were a total of 3661 (48.33%) females diagnosed with diverticula compared to 6768 (51.67%) males. Diverticulosis was noted in patients of all ages

Table 1. Distribution of Diverticulosis by Colon Segments

<table>
<thead>
<tr>
<th>Site</th>
<th>Total Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCENDING COLON</td>
<td>2226</td>
</tr>
<tr>
<td>DESCENDING COLON</td>
<td>4169</td>
</tr>
<tr>
<td>SIGMOID COLON</td>
<td>13547</td>
</tr>
<tr>
<td>TRANSVERSE</td>
<td>1942</td>
</tr>
<tr>
<td>RECTUM</td>
<td>496</td>
</tr>
</tbody>
</table>

Please Note: The total number of colonoscopies exceeds the number of patients as some patients have diverticula at multiple sites.
Diverticulosis is a common but usually asymptomatic disease of the colon. Diverticular disease is often reported in the literature yet there is lack information supporting true incidence and thus it has been hard to define in the past. This retrospective study examined 37616 colonoscopies in an outpatient endoscopy center for patients receiving screening exams as well as those with specific gastrointestinal complaints not related to diverticulosis. In this study we found incidence as 34.82%. This is higher compared to earlier findings such as those Smith and Christensen (1959) and Loffeld et al, who found a 22-27% incidence.17, 21

Diverticulosis has been determined to be a predominantly left sided colonic complication in the US and Western Europe in distinction with Asian countries where diverticula are found mostly in the right colon.3, 4, 14, 26 According to Lee et al the reason for this is unknown but right-sided diverticula appear to be caused by high intraluminal and motility pressures.14 Left-sided colonic diverticula are thought to be associated with low fiber diets.21

The incidence of diverticulosis is known to increase with age as seen on Figure 1. This increase with age remained steady, however, there was no statistically significant trend showing an increase in the number of cases diagnosed with diverticulosis over the nine years evaluated, as shown in Figure 3. Similar findings have been shown in Blachut et al and Loffeld et al.1, 2, 5, 7, 17, 25 Diverticulosis has been diagnosed in greater than 50% of people by the age of 70 to 80.2, 9, 10, 25 We showed more of a gradual increase with diverticulosis beginning at the age of 30 as opposed to the more dramatic increase after 50 years of age as reported by Painter and Burkitt.21 Increased intake of refined carbohydrates and decreased consumption of vegetables are thought to be the predominant factors for diverticulosis, but this has not been proven.21 A rising incidence is also seen countries that are changing to a more westernized diet and may explain the increase in diverticular disease in Asian countries.4 In contrast to other diverticulosis research, this study found that females and males
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Figure 2. There does not seem to be a difference in the incidence of diverticulosis between men or women of the same age. The dip in the graph seen in 2006 is due to a decreased number of patients being diagnosed with diverticulosis in that year.

![Percent of Males and Females with Diverticulosis and Total Incidence of Diverticulosis by Year](image)

have an equal incidence diverticulosis, 48.33% P(T<0.05) 2.415pp compared to 51.67% P(T<0.05) 0.51040439, respectively.\(^8\) Other studies, such as Takano et al, demonstrate a male predominance in Asian individuals with diverticulosis.\(^26\) In our research we see a dip in the number of cases reported to have diverticulosis in 2006, but even as the number of cases fluctuates, the ratio of males to females stays constant, as shown in Figure 2.

Other commonly associated comorbidities with diverticulosis are coronary artery disease, diabetes mellitus, and gallbladder disease. These findings were left out for accuracy because this medical information could not have been accessed through the database used.\(^8\) Recent studies have also looked at the correlation of diverticulosis and IBS, ulcerative colitis and the recurrence of Clostridium difficile; again this information was not assessed at this time.\(^11, 16, 24\) Eide and Stalsberg examined the correlation between polyps and diverticular disease, they found no association.\(^8, 20\)

This correlation could be looked at in future studies.

The main strength of this study is the very large number in a relatively asymptomatic healthy population. The fact that this study is retrospective is a weakness of the information being presented, but because of the high number of patients evaluated this should not hinder the trends discovered. A retrospective study does, at least in part, eliminate reporting biases that could occur with other studies that were actively looking for a diagnosis of diverticulosis. Additionally, the majority of patients examined in the clinic are healthy people in need of screening colonoscopies. This study aids in evaluating the incidence of diverticulosis in asymptomatic patients in whom diverticulosis could not have been discovered with barium enemas.

CONCLUSION

The incidence of diverticulosis in the population studied above is 34.82%. The incidence does not vary with gender but does show a sharp increase with age starting at age 30. This study is the largest in the United States and is the only one since 1959 to look at the incidence of diverticulosis. Diverticulosis is a significant part of
our population and is a growing concern for the older generations. Presumably the dietary deficiencies in this country are unlikely to change and thus it could be predicted that this problem will not be resolved in the near future. It is our job as clinicians and practitioners to educate our patients about the risk of diverticulosis and to prevent associated complications.

Acknowledgement
I would like to thank Dr. Duane Brandau and Vikki Garaux.

References