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Patients avoided important care during the early weeks of the coronavirus pandemic: diverticulitis patients were more likely to present with an abscess on CT

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Abstract

Purpose To evaluate the frequency with which patients with an urgent health concern, specifically diverticulitis, avoided appropriate medical care during the early weeks of the coronavirus pandemic of 2020 and to study the consequences of the resultant delay in care, the incidence of an associated abscess.

Methods This study was institutional review board approved. Reports for CT studies with findings of newly diagnosed diverticulitis within Henry Ford Health System during the early weeks of the coronavirus pandemic of 2020 were reviewed and compared with the same time period in 2019. Total cases of diverticulitis on CT were compared, as well as the prevalence of an associated abscess. A chi-squared analysis was performed to determine the statistical significance of the percentage of patients presenting with an abscess in each year.

Results During the early weeks of the coronavirus pandemic, 120 patients were identified with CT findings of newly diagnosed diverticulitis with 11.7% of those patients (14 patients) presenting with an associated abscess. During the same time period in 2019, many more CT studies with newly diagnosed diverticulitis were obtained (339), and, compared to 2020, less than half the percentage of those patients had an associated abscess (4.4% or 15 patients).

Conclusion Patients with urgent health concerns avoided appropriate and necessary care during the early weeks of the coronavirus pandemic. While non-COVID-19 emergency visits were diminished, patients who did present with diverticulitis were more likely to present with greater disease severity as manifested by an associated abscess. Patients must be encouraged to seek care when appropriate and need reassurance that hospitals and their emergency departments are safe to visit. Furthermore, emergency physicians and radiologists in particular should be vigilant during times when emergency volumes are low, such as a future surge in coronavirus patients, other pandemics, snow storms, and holidays as the patients who do present for care are more likely to present at later stages and with serious complications.

Keywords COVID · COVID-19 · Coronavirus · Diverticulitis · Abscess · Emergency · Delay · Pandemic

Introduction

The coronavirus pandemic of 2020 has undoubtedly resulted in serious consequences both directly and indirectly [1–3]. Millions of people across the world have been infected, and

at the time of this paper, hundreds of thousands have died [4]. In addition to the health consequences of COVID-19, there has been an economic cost with lives interrupted through the loss of a business or a job, and a psychological toll difficult to accurately measure.

The fear of this disease, particularly in its early months, has also led to consequences that many did not expect [1, 5]. While people appropriately avoided social interactions and other leisure activities, many also avoided what typically would be considered essential medical care for acute conditions [6].

Hospitals were forced to adjust dramatically and often throughout the early weeks of the pandemic [7, 8]. Making patients and employees safe and feel safe became more of a

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priority than ever before [7]. Regardless, patients still often became convinced that a trip to the emergency room would put them at risk and should be avoided, resulting in delayed care, even to the point of dying at home [9].

Symptoms of diverticulitis are frequently nonspecific and patients with abdominal pain can often put off care for an extended period of time before serious complications result. Like most hospitals during the coronavirus pandemic, Henry Ford Health System in southeast Michigan saw a dramatic decrease in patients seeking emergency care. Through a review of CT studies with positive findings of diverticulitis during the early months of the coronavirus pandemic, in comparison with the same time period in 2019, this study examines and illustrates the dramatic decline in truly sick patients with urgent needs seeking care and the likelihood of patients presenting with more severe disease with complications, i.e., an associated abscess.

Methods

The World Health Organization (WHO) declared the coronavirus pandemic on March 11, 2020. Reports for CT studies performed within the Henry Ford Health System from the day after the pandemic declaration through the end of the month of April, with positive indicators for diverticulitis in the impression, were retrospectively reviewed. Subsequently, a similar review was completed for the same time period in 2019 (March 12, 2019, through April 30, 2019).

The CT reports were initially filtered utilizing Illuminate Insight software (Overland Park, Kansas) using a key word search of “diverticulitis” with positive indicators within the impression. The reports were then further reviewed by a board-certified radiologist. Cases of newly diagnosed diverticulitis were included, but any additional follow-up CT studies on those same patients during the time period being analyzed were excluded from analysis. Patients with chronic diverticulitis were also excluded. Examinations were included if a differential diagnosis was listed in the impression that favored diverticulitis (e.g., “small segment of colitis or diverticulitis”) but were excluded if the differential diagnosis did not favor diverticulitis or there was a clearly more likely diagnosis (e.g., “colitis with diverticulitis felt unlikely given the long segment of involved colon and lack of diverticula”).

Subsequently, the remaining patients were divided into patients where the report described the presence of an abscess related to diverticulitis and those without mention of an associated abscess. The presence of abscess in the setting of diverticulitis was identified as a key indicator of disease severity as opposed to other complications, such as free air, as an abscess is the primary determinant for advancing severity grade of acute diverticulitis in the commonly utilized Hinchey classification [10]. The studies with reports that described the

presence of an associated abscess were reviewed independently for the presence of abscess by two board-certified radiologists, including one emergency radiologist (4 years post fellowship experience) and one abdominal radiologist (23 years post fellowship experience). Any discrepancies regarding the presence or absence of abscess were resolved by consensus agreement.

Utilizing a chi-squared analysis, the number of patients with an abscess related to diverticulitis in relation to those without an abscess in 2020 was compared with those in 2019.

Results

Throughout the Henry Ford Health System from the day after the declaration of the coronavirus pandemic by the WHO on March 11, 2020, through the end of April 2020, there were 120 CT studies identified with newly diagnosed diverticulitis. Many more cases of diverticulitis, 339, were identified on CT studies during the same 50 day period in 2019 (Fig. 1).

While there were many more cases of newly diagnosed diverticulitis seen on CT in 2019, there was a similar number of diverticulitis cases with an associated abscess in both 2019 and 2020, 15 and 14 respectively (Fig. 1). The incidence of abscess in the 2020 COVID-19 patient cohort was greater than double the incidence of abscess in the 2019 patient cohort, 11.7% and 4.4%, respectively. A chi-squared analysis of these numbers demonstrates a *p* value of < 0.01, confirming a statistically significant difference.

Discussion

Healthcare systems throughout the world have been dealing with extraordinarily challenging and rapidly evolving challenges resulting from the coronavirus pandemic. Hospitals have been tasked with fighting a pandemic while continuing to provide other necessary care [11–13]. While many departments spent time overwhelmed with COVID-19 patients, the typical emergency cases diminished in volume. As a result, many emergency departments saw dramatic declines in overall patient volumes.

There is an undeniable number of patients treated each year in an emergency department that may have been more appropriately treated on an outpatient, non-emergent basis. While that may have contributed to a decline of emergency department patient visits and imaging, this study demonstrates that the patients who did present to the emergency department often presented with greater disease severity, and many patients appear to have delayed important care.

One weakness in this assessment is the inability to account for patients that avoided imaging if they were evaluated at a telemedicine visit as presumed diverticulitis and were treated

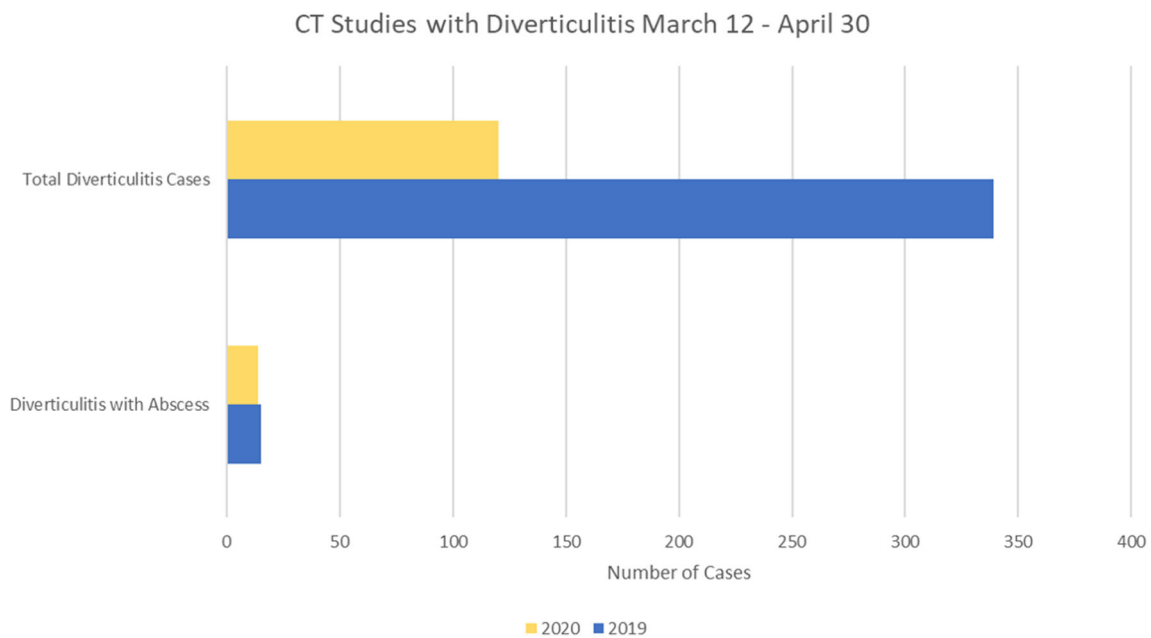


Fig. 1 CT studies with diverticulitis in 2020 and 2019

without imaging. It is felt to be unlikely that this alone would account for such a dramatic difference in number of patients diagnosed on CT, particularly as the telemedicine response was not robust during the early phase of the pandemic. This study does support the argument that the sickest patients have generally continued to seek appropriate care—in this case, those with an abscess.

This study is not without limitations. Utilizing a database search of radiology reports with positive indicators means that patients with diverticulitis who were not imaged or CT scans that were not interpreted correctly for the presence of diverticulitis may result in omission of these patients from data analysis. Additionally, CT findings of diverticulitis can be nonspecific and overlap with other diagnoses. These limitations are unlikely to affect the conclusions of this study or statistical significance.

Future studies would be useful to evaluate diverticulitis in the months following a return to more normal volumes in emergency departments. It would be interesting to evaluate whether there is a post-pandemic surge of patients with diverticulitis and whether patients are presenting with a more advanced presentation, with more associated complications, secondary to waiting longer to seek care.

Avoiding care has obvious consequences. Hospitals, and their emergency departments, continue to work toward providing patients with a safe environment in addition to a feeling of safety during hospital visits [14]. It is essential for the medical community to continue to encourage the public to seek care when appropriate. Additionally, during any future surge in COVID-19 patients or other future pandemics, emergency department physicians and radiologists must stay vigilant when diagnosing and treating more traditional cases. While

there may be a decline in cases such as diverticulitis, those cases that do present are more likely to present in later stages and with serious complications. Similarly, this same concept should apply during other times when care may be delayed, and hospitals and emergency departments are quiet, such as during holidays or snow storms.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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