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Dra. Diana Maria Herrera
Uriostegui, Internal Medicine
Resident at General Hospital
Zone No. 20, Puebla, Mexico

Dra. MC. Eugenia Montserrat
Ramales Montes
Specialist in Dermatology,
assigned to Regional General
Hospital No. 36, Puebla,
Mexico

Dr. Hugo Rodríguez Martínez,
Gastroenterology and
Endoscopist Specialist,
assigned to General Hospital
Zone No. 20, Puebla, Mexico

Digestive lesions in subjects with COVID-19 treated in the endoscopy service of HGZ No. 20

Dra. Diana Maria Herrera Uriostegui, Dra. MC. Eugenia Montserrat Ramales Montes and Hugo Rodríguez Martínez

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Abstract

Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) primarily affects the respiratory tract; however, gastrointestinal involvement has been increasingly reported. Identifying digestive lesions in COVID-19 patients undergoing endoscopic procedures provides insight into the disease's systemic impact and potential complications.

Objective: To determine the prevalence and characteristics of digestive lesions in COVID-19 patients treated in the Endoscopy Unit of HGZ No. 20.

Methods: A descriptive, observational, cross-sectional, unicentric, retrospective study was conducted in the Endoscopy Unit of HGZ No. 20 "La Margarita", Puebla, Mexico. Medical records of patients aged ≥ 18 years with PCR-confirmed COVID-19 who underwent upper endoscopy, colonoscopy, or panendoscopy during hospitalization (March 1, 2020–October 30, 2021) were analyzed. Data collected included demographics, comorbidities, medication use (NSAIDs, antibiotics, anticoagulants, steroids), and endoscopic findings. Descriptive statistics were performed.

Results: Sixty patients were included (51.7% male, mean age 60.9 ± 14.4 years). Hypertension and type 2 diabetes mellitus were the most frequent comorbidities (66.7% and 58.6%, respectively). A total of 110 digestive lesions were identified. The most common findings were gastritis (21.8%), erythematous gastropathy (18.2%), and esophagitis (13.6%). Upper gastrointestinal bleeding occurred exclusively in female patients (100%), with gastric ulcer being the predominant lesion, whereas lower gastrointestinal bleeding was found only in males (100%) with hemorrhoidal disease. Patients aged 60–69 years presented the highest number of lesions ($n = 30$). All patients received antibiotics and anticoagulants; NSAIDs and steroids were more frequently administered to males.

Conclusion: Digestive lesions were prevalent in hospitalized COVID-19 patients, especially in individuals over 50 years old. Gastritis, erythematous gastropathy, and esophagitis were the most frequent findings. The study highlights the importance of gastrointestinal evaluation in COVID-19 patients and the potential role of comorbidities and treatment regimens in the development of lesions.

Keywords: COVID-19, gastrointestinal lesions, endoscopy, gastritis, erythematous gastropathy, esophagitis

Introduction

The coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been recognized as a major global health threat due to its high morbidity and mortality rates. Initially identified as a respiratory illness, emerging clinical data has demonstrated that SARS-CoV-2 is a multisystemic virus capable of affecting various organs, including the gastrointestinal (GI) tract and liver. Hospital-based studies have reported digestive symptoms such as diarrhea, anorexia, nausea, and vomiting in a significant proportion of patients, sometimes as the first or only clinical manifestation of the disease [1, 2]. These findings have emphasized the need to investigate the gastrointestinal component of COVID-19, as misrecognition can delay diagnosis and appropriate management. Multiple reports have confirmed that the virus infects GI epithelial cells through angiotensin-converting enzyme 2 (ACE2) receptors, which are widely expressed in the enterocytes of the ileum and colon [3, 4]. This receptor-mediated tropism explains both the presence of digestive symptoms and the prolonged detection of viral RNA in fecal samples even after respiratory clearance [5, 6].

Corresponding Author:
Dra. Diana Maria Herrera
Uriostegui, Internal Medicine
Resident at General Hospital
Zone No. 20, Puebla, Mexico

The implication of the GI tract as a reservoir has also raised concern about potential fecal-oral transmission, making the study of digestive manifestations relevant not only for clinical management but also for public health policies [7].

Endoscopic findings in COVID-19 patients have been diverse, ranging from mild mucosal erythema to severe ulcerative lesions and ischemic colitis. Several series have documented upper gastrointestinal bleeding (UGIB) as a life-threatening complication, often associated with gastric or duodenal ulcers and stress-related mucosal damage [8–10].

In addition, reports have noted that these lesions may be exacerbated by pharmacological interventions commonly used to manage COVID-19, such as corticosteroids, anticoagulants, and non-steroidal anti-inflammatory drugs (NSAIDs), further complicating the clinical picture [11].

The prevalence of gastrointestinal symptoms in hospitalized patients has varied widely across studies, ranging from 3% to 79%, depending on the population, severity of illness, and diagnostic criteria [12, 13]. In a multicenter study conducted in Hubei, China, more than 50% of patients presented with GI manifestations, with loss of appetite and diarrhea being the most common [1]. Other cohorts have reported that the presence of digestive symptoms correlates with increased disease severity and prolonged hospital stays, highlighting their prognostic significance [2].

Histopathological analyses have corroborated the presence of SARS-CoV-2 in gastric, duodenal, and rectal glandular epithelial cells, further supporting direct viral involvement in mucosal injury [3, 14]. Additionally, elevated levels of inflammatory cytokines such as IL-6 and TNF- α in patients with COVID-19 have been implicated in the pathogenesis of GI lesions, suggesting that both viral cytopathic effects and systemic inflammatory responses contribute to mucosal damage [10, 15].

Despite the growing body of international evidence, data from Latin American populations remain scarce. In Mexico, where comorbidities such as type 2 diabetes mellitus and hypertension are highly prevalent, the interaction between underlying conditions, therapeutic regimens, and the development of gastrointestinal lesions in COVID-19 patients warrants specific evaluation [16]. Understanding these associations is essential for tailoring diagnostic and therapeutic strategies to the local epidemiological context.

The present study was conducted to describe the digestive lesions observed in COVID-19 patients who underwent upper endoscopy and colonoscopy during hospitalization in the Endoscopy Unit of HGZ No. 20 “La Margarita” in Puebla, Mexico. By analyzing the frequency and types of lesions in relation to demographic characteristics, comorbidities, and treatments administered, this research aims to contribute to the understanding of gastrointestinal manifestations of COVID-19 in a Mexican cohort and provide a basis for improving clinical management protocols.

This study seeks to generate local evidence that can serve as a reference for future multicenter investigations and support the development of standardized guidelines for the diagnosis and treatment of GI complications in patients affected by SARS-CoV-2. The findings presented here are intended not only to add to the existing literature but also to guide clinicians in recognizing and addressing gastrointestinal involvement in the context of a highly complex, systemic viral disease.

Materials and Methods

Study Design

This was a descriptive, observational, cross-sectional, unicentric, and retrospective study designed to identify gastrointestinal lesions in patients diagnosed with COVID-19 who underwent endoscopic procedures during hospitalization. The research adhered to institutional protocols and was conducted under the principles of the Declaration of Helsinki for research involving human subjects [17].

Study Area

The study was carried out in the Endoscopy Unit of Hospital General de Zona No. 20 “La Margarita” (IMSS), located in Puebla, Mexico. This tertiary care center serves a large population of insured patients and functions as a referral hospital for complex gastrointestinal cases, providing an ideal setting to analyze the digestive manifestations associated with SARS-CoV-2 infection in hospitalized individuals.

Population and Sample

The study population included all patients aged 18 years and older with a confirmed diagnosis of COVID-19 through polymerase chain reaction (PCR) testing who required upper endoscopy, colonoscopy, or panendoscopy during their hospital stay between March 1, 2020, and October 30, 2021. A total of 60 patients met the eligibility criteria and were included in the final analysis, a sample size considered appropriate for descriptive clinical research and consistent with similar retrospective studies reported in the literature [6, 9].

Inclusion and Exclusion Criteria

Inclusion criteria comprised patients with PCR-confirmed SARS-CoV-2 infection who underwent at least one endoscopic procedure during hospitalization and who signed informed consent for participation. Exclusion criteria were incomplete medical records or negative PCR results. Patients were eliminated if they requested voluntary withdrawal, were transferred to another medical facility, or died during the study period before completion of data collection.

Data Collection and Variables

Data were obtained retrospectively from electronic medical records and endoscopy reports. Variables included demographic information (age, sex), comorbidities, type of endoscopic procedure performed, and medications administered during hospitalization, specifically non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics, anticoagulants, and corticosteroids, as these are commonly used in COVID-19 treatment and have been linked to gastrointestinal adverse effects [11]. A standardized data collection sheet was used to ensure uniformity and reduce potential bias.

Endoscopic Procedures and Instruments

All procedures were performed in the hospital’s Endoscopy Unit using Fujifilm Series 530 endoscopes. Lesions were classified according to anatomical location and type, including esophagitis, gastritis, erythematous gastropathy, gastric and duodenal ulcers, vascular lesions, portal

benign or malignant tumors. Reports were reviewed to ensure consistent terminology and accurate categorization of findings.

Statistical Analysis: Data were analyzed using IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize categorical variables as absolute and relative frequencies and continuous variables as means and standard deviations. Tables and graphs were created to display the distribution of demographic variables, comorbidities, and lesion types ^[18].

Ethical Considerations: The study protocol was reviewed and approved by the local ethics and research committees of the IMSS. The research was classified as “minimal risk” according to the Mexican Reglamento de la Ley General de Salud en Materia de Investigación en Salud, as it involved retrospective review of clinical records without direct patient intervention ^[19]. Informed consent was obtained from all participants or their legal representatives, and data confidentiality was strictly maintained throughout the study.

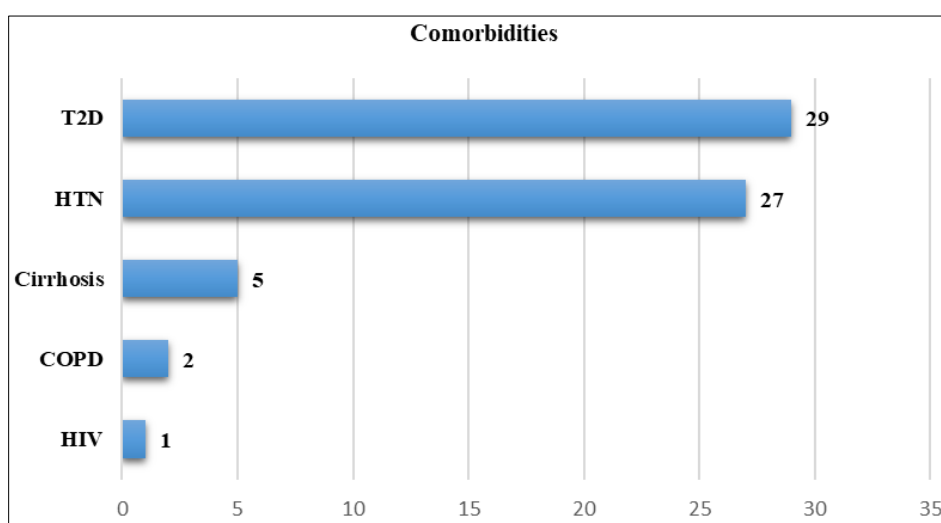
Results: A total of 60 hospitalized patients with PCR-confirmed COVID-19 who underwent endoscopic evaluation were included. The cohort consisted of 29 women (48.3%) and 31 men (51.7%), ranging from 23 to 90 years old, with a mean age of 60.9 ± 14.4 years. As shown in Table 1, most patients were aged 50 years or older,

highlighting a demographic pattern where older adults predominate among those requiring endoscopy during COVID-19 infection.

Table 1: Demographic characteristics of the study population

Age range	Frequency	Percentage
20–29	1	1.7%
30–39	4	6.7%
40–49	8	13.3%
50–59	15	25%
60–69	15	25%
70–79	11	18.3%
80–89	3	5%
≥90	3	5%
Sex distribution		
Sex	Frequency	Percentage
Female	29	48.3%
Male	31	51.7%

Hypertension and type 2 diabetes emerged as the most prevalent comorbidities. Hypertension was documented more frequently in women, while type 2 diabetes predominated in men. As illustrated in Figure 1, the overall distribution of comorbidities reflects a metabolic profile common in the population. Meanwhile, Figure 2 further breaks down the contrast between hypertension and diabetes by sex, underscoring potential sex-specific risk patterns.



Source: Own elaboration based on database

Fig 1: Comorbidities of study participants.

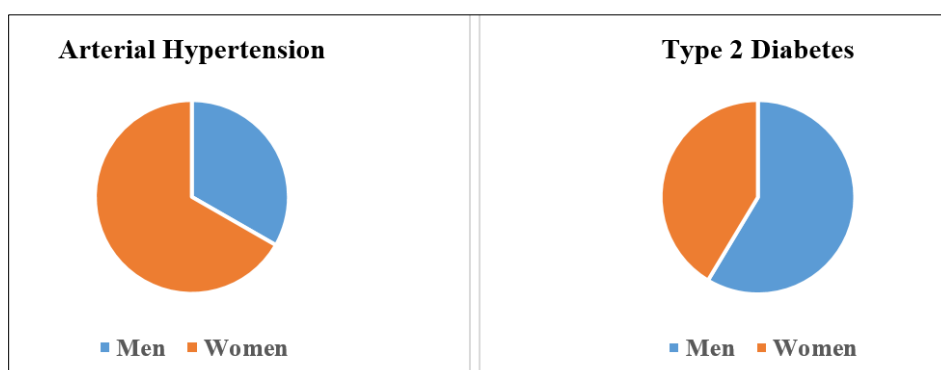


Fig 2: Distribution of hypertension and type 2 diabetes mellitus by sex (color online)

A total of 110 digestive lesions were identified across different procedures. The most common findings included gastritis (21.8%), erythematous gastropathy (18.2%), and esophagitis (13.6%), followed by portal hypertensive gastropathy (9.1%) and benign tumors (5.5%). More than half of the patients presented with multiple concurrent lesions. Table 2 summarizes the distribution of lesion types according to procedure type—upper endoscopy, panendoscopy, or colonoscopy.

Table 2: Digestive lesions detected by type of procedure

Lesion	Endoscopy	Panendoscopy	Colonoscopy	Total
Upper GI bleeding	3	3	0	6
Esophagitis	6	9	0	15
Gastritis	7	17	0	24
Erythematous gastropathy	10	10	0	20
Gastric ulcer	2	6	0	8
Peptic ulcer	1	3	0	4
Vascular disease	0	3	0	3
Portal hypertensive gastropathy	6	4	0	10
Lower GI bleeding	0	0	1	1
Colitis	0	0	4	4
Hemorrhoidal disease	0	0	7	7
Benign tumor	2	2	2	6
Malignant tumor	0	1	1	2

When lesions were stratified by age group, patients aged 60–69 years had the highest number (n = 30), followed by 50–59 years (n = 24) and 70–79 years (n = 21). Table 3 provides a detailed breakdown of the frequency of each lesion type by age group, revealing that gastritis and erythematous gastropathy were most frequent in those over 50, while esophagitis appeared more evenly across ages.

Table 3: Distribution of lesions by age group

Lesion	20–29	30–39	40–49	50–59	60–69	70–79	80–89	≥90
Upper GI bleeding	0	0	0	2	3	1	0	0
Esophagitis	1	1	3	3	3	2	1	1
Gastritis	1	3	4	2	7	4	1	2
Erythematous gastropathy	0	1	4	3	2	6	2	2
Gastric ulcer	0	0	2	1	1	3	0	1
Peptic ulcer	0	0	0	0	2	2	0	0
Vascular disease	0	0	0	0	2	0	1	0
Portal hypertensive gastropathy	0	0	1	5	4	0	0	0
Lower GI bleeding	0	0	0	0	1	0	0	0
Colitis	0	0	0	2	1	1	0	0
Hemorrhoidal disease	0	0	0	4	2	1	0	0
Benign tumor	0	0	2	1	2	1	0	0
Malignant tumor	0	0	1	1	0	0	0	0

Upper gastrointestinal bleeding (UGIB) occurred exclusively in female patients, with gastric ulcer being the predominant associated lesion. By contrast, lower gastrointestinal bleeding (LGIB) occurred only in male patients, all diagnosed with hemorrhoidal disease. These sex-specific distributions may be influenced by differential medication use or underlying vascular conditions.

Regarding treatment regimens, all patients received antibiotics and anticoagulants as part of COVID-19 management. NSAID use was noted in 57% and corticosteroid use in 68% of patients, with males showing a slightly higher rate of combined anti-inflammatory therapy. Table 4 shows the breakdown of NSAID and steroid usage by sex, and Table 5 illustrates combined treatment regimens including antibiotics and anticoagulants.

Table 4: Use of NSAIDs and corticosteroids by sex

Sex	NSAIDs Yes	NSAIDs No	Steroids Yes	Steroids No
Male	19	12	25	6
Female	15	14	16	13
Total	34	26	41	19

Table 5: Combined pharmacological regimens in COVID-19 patients

Sex	NSAIDs + Steroids Yes	NSAIDs + Steroids No	Full regimen (NSAIDs + Steroids + Antibiotics + Anticoagulants) Yes	Full regimen No
Male	19	12	19	12
Female	9	20	9	20
Total	28	32	28	32

The detailed evaluation of individual lesion types revealed additional patterns. Chronic gastritis was the predominant subtype, while non-erosive esophagitis was the most frequently encountered esophageal lesion. Erythematous gastropathy was especially prevalent among male patients aged 70–79 years, whereas portal hypertensive gastropathy showed a concentration in patients aged 50–59 years and was frequently associated with variceal findings. Colitis, including pseudomembranous cases identified by colonoscopy, was documented exclusively in patients over 50 years of age, reinforcing the observation that older individuals may be more susceptible to severe gastrointestinal manifestations during COVID-19 infection. Here the author(s) should be presented the clear and concise findings of the experiment/study. It should be written in past tense. The results should be given here without any references.

Discussion

The findings of this study highlight the significant involvement of the gastrointestinal (GI) tract in patients hospitalized with COVID-19, demonstrating that SARS-CoV-2 infection extends beyond the respiratory system and can manifest with a broad spectrum of digestive lesions. The predominance of gastritis, erythematous gastropathy, and esophagitis aligns with previously published literature that has identified these lesions as common endoscopic findings in COVID-19 cohorts [5,8,9]. In this study, gastritis accounted for 21.8% of all lesions, a result that is comparable to the 22% rate of erosive gastritis reported by Mauro et al. [16] and the 16.6% reported by Massironi et al. in their multicenter study conducted in Lombardy [15]. This consistency reinforces the hypothesis

that mucosal inflammation is a frequent consequence of either direct viral injury or the systemic inflammatory response triggered by SARS-CoV-2.

Erythematous gastropathy, present in 18.2% of patients in this cohort, was more prevalent than in the international series by Vanella et al., who reported 9.2% of cases with petechial or hemorrhagic gastropathy [9]. The higher proportion observed in our population may reflect differences in baseline comorbidities, pharmacological exposure, or the severity of COVID-19 at the time of endoscopic evaluation. Esophagitis, identified in 13.6% of our patients, was less frequent than the 20.8% described by Massironi et al. [15] and considerably lower than the 31% of esophageal lesions reported by Blackett et al. [17], suggesting potential variability in clinical presentation between populations and emphasizing the need for regional data to complement global findings.

One of the most notable results was the sex-specific distribution of gastrointestinal bleeding. All cases of upper GI bleeding (UGIB) occurred in female patients, predominantly associated with gastric ulcer, while lower GI bleeding (LGIB) was observed exclusively in male patients with hemorrhoidal disease. These patterns differ from those described by Zhao et al. and Mauro et al., who found UGIB more frequently in male patients [10, 16]. Biological and hormonal factors have been proposed as potential modulators of immune and vascular responses to SARS-CoV-2, and our findings provide additional evidence that sex differences must be considered in the management of GI complications during COVID-19 [11].

The high prevalence of comorbidities, particularly type 2 diabetes mellitus and hypertension, is consistent with national epidemiological data and with reports that link these conditions to worse outcomes and greater susceptibility to severe COVID-19 manifestations [1, 2]. Their association with mucosal lesions may be multifactorial, as chronic metabolic disorders are known to impair microvascular integrity and modulate inflammatory pathways, potentially amplifying the gastrointestinal impact of SARS-CoV-2 infection.

Pharmacological exposure during hospitalization is another critical factor to consider when interpreting our findings. All patients received antibiotics and anticoagulants, and more than half were treated with corticosteroids and NSAIDs. This combination, documented in 46.6% of cases, has been associated with increased risk of stress-related mucosal damage and gastrointestinal bleeding in hospitalized patients [6]. However, as with other retrospective studies, this work could not fully assess prior medication use, exact dosages, or treatment duration, limiting the ability to attribute lesions solely to drug effects.

Age was a clear determinant in the distribution of lesions. Patients aged 60–69 years exhibited the highest frequency, followed by those in the 50–59 and 70–79 groups. This pattern supports previous observations that older adults are particularly vulnerable to extrapulmonary complications of COVID-19 [3, 4]. The multifocal presentation of lesions in more than half of the patients further suggests that gastrointestinal involvement in SARS-CoV-2 infection is not limited to a single anatomical site but may represent a diffuse mucosal response to viral and inflammatory injury. The significance of these results lies in their contribution to the limited data available from Latin American populations. While most existing studies are from Asia, Europe, and

North America, the demographic and epidemiological profile in Mexico—with a high prevalence of chronic metabolic diseases—makes local evidence essential for understanding how COVID-19 interacts with underlying risk factors to produce gastrointestinal manifestations. These findings underscore the need for early recognition of GI involvement and proactive management strategies, including careful monitoring of patients on combined anti-inflammatory and anticoagulant therapies.

Finally, the study reinforces the importance of multidisciplinary approaches in the care of hospitalized COVID-19 patients. Gastroenterologists, internists, and critical care teams must work together to identify and treat digestive lesions promptly to reduce morbidity and prevent severe complications such as bleeding. Further prospective studies with standardized lesion classification and histopathological correlation are warranted to elucidate the exact mechanisms underlying these findings and to guide evidence-based clinical protocols.

Conclusion

This study demonstrated that digestive lesions are common in hospitalized COVID-19 patients, particularly among individuals over 50 years of age. Gastritis, erythematous gastropathy, and esophagitis were the predominant findings, while upper gastrointestinal bleeding was observed exclusively in female patients and lower gastrointestinal bleeding in males. The results emphasize the need to consider gastrointestinal evaluation as part of the comprehensive management of SARS-CoV-2 infection, especially in patients with chronic metabolic comorbidities and those receiving combined anti-inflammatory and anticoagulant therapies. Early detection and multidisciplinary management of these lesions are essential to reduce complications and improve outcomes in this vulnerable population.

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