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Endoscopic Findings in Patients Infected With 2019 Novel Coronavirus in Lombardy, Italy

Sara Massironi,[*] Chiara Viganò,[*] Lorenzo Dioscoridi,[‡] Elisabetta Filippi,[§,¶¶] Michela Pagliarulo,[‖] Guido Manfredi,[¶] Clara Benedetta Conti,[#] Clementina Signorelli,[**] Alessandro Ettore Redaelli,[‡‡] Giulia Bonato,[‡] Elena Iiritano,[¶] Roberto Frego,[‡‡] Nicola Zucchini,[§§] Marco Ungari,[‖‖] Marianna Pedaci,[¶] Francesca Bono,[§§] Camillo Di Bella,[§§] Elisabetta Buscarini,[¶] Massimiliano Mutignani,[‡] Roberto Penagini,[§] Marco Emilio Dinelli,[‡‡] and Pietro Invernizzi[*]

[*]Division of Gastroenterology and Center for Autoimmune Liver Diseases, Department of Medicine and Surgery, University of Milano-Bicocca, and European Reference Network on Hepatological Diseases (ERN RARE-LIVER), San Gerardo Hospital, Monza; [‡]Niguarda Hospital, Diagnostic and Interventional Digestive Endoscopy Milano, Lombardia; [§]Department of Pathophysiology and Transplantation, University of Milan; [‖]Division of Endoscopy, A. Manzoni Hospital, ASST Lecco; [¶]Department of Gastroenterology and Endoscopy, Maggiore Hospital, ASST Crema, Crema; [#]Digestive Endoscopy and Gastroenterology Unit, ASST Cremona, Cremona; [**]Gastroenterology and Endoscopy Unit, ASST-Bergamo Ovest, Treviglio, Bergamo; [‡‡]Endoscopy Unit, San Gerardo Hospital, ASST Monza; [§§]Division of Pathology, San Gerardo Hospital, ASST Monza, Monza; [‖‖]Division of Pathology, ASST Cremona, Cremona; and [¶¶]Gastroenterology and Endoscopy Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

This article has an accompanying continuing medical education activity, also eligible for MOC credit, on page e122. Learning Objective–Upon completion of this activity, successful learners will be able to list the most common upper endoscopic findings in patients infected with 2019 novel coronavirus (SARS-Cov-2), list the most common lower endoscopic findings in patients infected with SARS-Cov-2; list appropriate PPE for health care providers performing endoscopic evaluation in patients positive or at high risk of SARS-Cov-2; and realize prioritization of endoscopic evaluation of GI bleeding in high-risk patients should be determined by clinical factors and not SARS-Cov-2 status.

Coronavirus disease 2019 (COVID-19) is a major worldwide threat caused by a novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), rapidly spreading to a global pandemic. As of May 11, 2020, 4,176,346 cases have been reported worldwide, 219,814 in Italy, and of them, 81,871 occurred in the Lombardy region.[1] Although the respiratory manifestations of COVID-19 have been widely described, the impact on the gastrointestinal (GI) system remains less clear. The reported prevalence of digestive symptoms ranges from 3% to 79%, depending on the setting,[2–5] but data on GI endoscopic and histologic findings in COVID-19 patients are lacking. Therefore, the aim of this study is to describe the GI endoscopic and histologic findings in COVID-19 patients.

Methods

In this multicenter retrospective study, patients with confirmed SARS-CoV-2 infection who underwent an endoscopic examination at 7 hospitals in Lombardy were enrolled between February 21 and April 20, 2020. The staff involved in the endoscopy followed standardized precautions by using adequate personal protective equipment, including a filtering face-piece, goggles, 2 pairs of gloves, and surgical gowns.[6] Patients also had to wear a surgical mask and gloves. Patients provided informed consent for the inclusion in this study, according to the ethical guidelines of the 1975 Declaration of Helsinki.

Results

Twenty-four esophagogastroduodenoscopies (EGDs) and 20 colonoscopies, performed in 38 COVID-19 patients, were examined. The mean age was 71 years, and 74% were men. Among the 38 patients, 37 (97%) required hospitalization. Eight patients (21%) were admitted to an intensive care unit. Twenty-seven patients (71%) needed oxygen support during hospitalization, with 8 (21%) requiring invasive ventilation and 7 (18%) requiring continuous positive airway pressure ventilation. Specific COVID-19 treatment was started in 22 patients (58%), with 18 patients (47%) receiving hydroxychloroquine, 10 (26%) lopinavir-ritonavir, 3

Abbreviations used in this paper: **COVID-19, coronavirus disease 2019; EGD, esophagogastroduodenoscopy; GI, gastrointestinal; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.**

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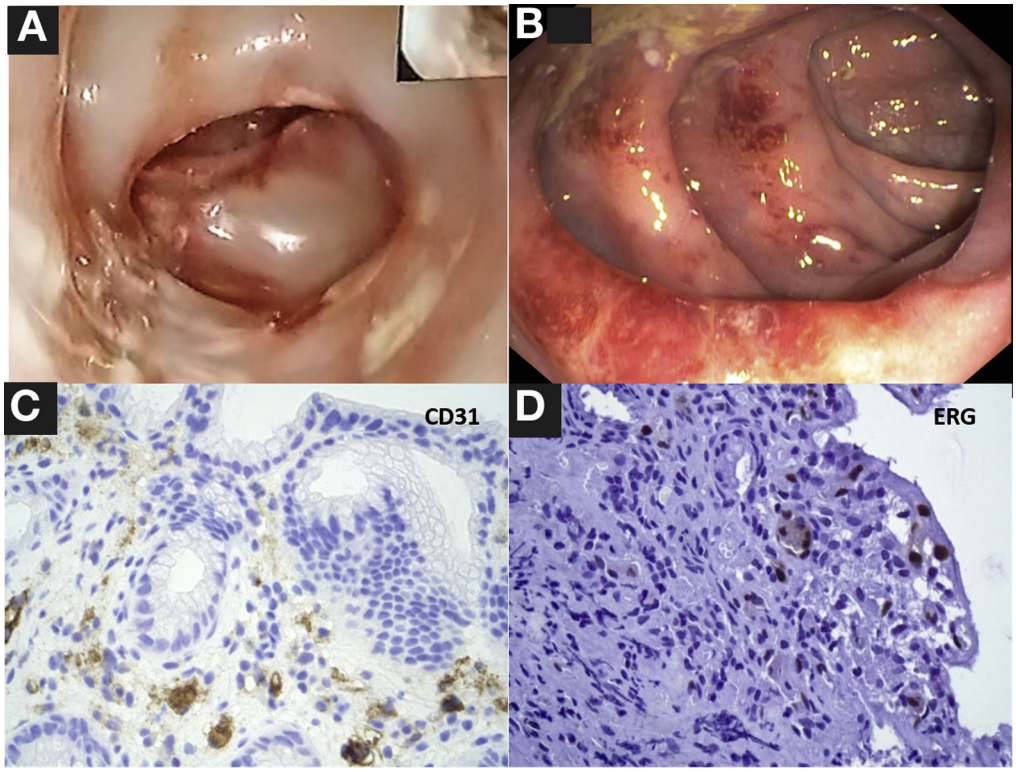

Figure 1. Ulcerative endoscopic lesions with the characteristics of colon ischemia (*A*) and segmental colitis associated with diverticulosis (*B*), observed in 2 COVID-19 patients. Histopathologic findings in a case of colon ischemia are shown in (*C*) and (*D*); numerous vessels with the lumen obstructed by fibrinous thrombus are recognizable beneath the surface epithelium. ERG is a nuclear marker (*brown*) of endothelial cells of the vessels. CD31 is a cytoplasmic marker for both the endothelial cells of the vessels and the platelets.

(8%) tocilizumab, and 4 (11%) remdesivir. Thromboprophylaxis was started at COVID-19 diagnosis in 29 patients (76%). During the study period, 5 patients (13%) died of COVID-19 after a median of 10 days (interquartile range, 9.5–25) from diagnosis.

Endoscopic lesions were observed in 18 of 24 EGDs (75%) and in 14 of 20 colonoscopies (70%). The main findings during EGD consisted of esophagitis in 5 cases (20.8%), bulbar ulcer in 5 (20.8%), erosive gastritis in 4 (16.6%), neoplasm in 2 (8.3%), and Mallory-Weiss tear in 1 patient (4.1%). The main findings during colonoscopy (Figure 1) included segmental colitis associated with diverticulosis in 5 cases (25%), histologically confirmed colon ischemia in 4 (20%), diffuse hemorrhagic colitis in 1, and neoplasm in 1; in 3 patients the colonic mucosa appeared normal on visualization, but there was histologic evidence of microscopic (2 cases) and lymphocytic (1 case) colitis. None of the endoscopists became infected after the procedures.

Discussion

This case series highlights the GI endoscopic and histologic findings in 38 COVID-19 patients. Endoscopic examination was abnormal in a high proportion of cases, and there was a wide heterogeneity in the endoscopic findings. Peptic ulcers and esophagitis were detected in most upper GI endoscopies, and colitis, ranging from mild to more severe ulcerative lesions, was the most common finding during colonoscopy. Most patients required endoscopy because of GI bleeding, which could be related to the concomitant low molecular weight heparin therapy (76% of patients), bleeding predisposition in patients with severe infection, and/or disseminated intravascular coagulation, which is one of the major causes of organ dysfunction in sepsis.[7] Moreover, the high proportion of ulcerative colonic lesions observed in our series, with pictures superimposed on either segmental colitis associated with diverticulosis or colonic ischemia, could suggest an ischemic injury possibly due to a thrombotic dysfunction attributable to excessive inflammation, platelet activation, and endothelial dysfunction.[8] On the other hand, colonic ischemia can be caused by hypoperfusion state that is due to transient hypotension or shock related to sepsis itself. Furthermore, a direct inflammatory effect on the GI mucosa can be hypothesized, because SARS-CoV-2 binds to the angiotensin-converting enzyme-2 receptors, which are also constitutively expressed in the GI tract.[2]

The limits of our study are the relatively small sample size and the retrospective nature of the study. However, this study highlights the heterogeneous and wide spectrum of GI manifestation in COVID-19, of which gastroenterologists and endoscopists should be aware. More research is needed to elucidate the extent to which some of the endoscopic and histologic findings are attributable to the virus. Last, the fact that none of the endoscopists was infected is reassuring for endoscopists as they begin to reopen practices.

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Reprint requests
Address requests for reprints to: Sara Massironi, MD, PhD, Division of Gastroenterology and Hepatology, San Gerardo Hospital, University of Milano - Bicocca School of Medicine, Via Pergolesi, 33, 20900 Monza (MB), Italy. e-mail: sara.massironi@libero.it; fax: +390392300129.

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Conflicts of interest
The authors disclose no conflicts.