00639

Capsule Endoscopy Findings in Patients with Severe Sars-CoV-2 Infection, a Pilot Study.

Daniela Garrido-Gutierrez[1], **Fernanda Torres-Ruiz**[2], Gerardo Blanco-Velasco[3], Amy B. Peralta-Prado[4], Isabel León-Rodríguez[5], Julio C. Lara-Muñoz[6], William C. Lara-Vazquez[7], Dulce M. López-Sánchez[8], Gonzalo Salgado-Montes de Oca[9], Santiago Ávila-Ríos[10]

[1,2,4-10] Centro de Investigación en Enfermedades Infecciosas del Instituto Nacional de Enfermedades Respiratorias. México City, México. [3]Instituto Mexicano del Seguro Social, Centro Médico Nacional SXXI. Mexico City, México

BACKGROUND

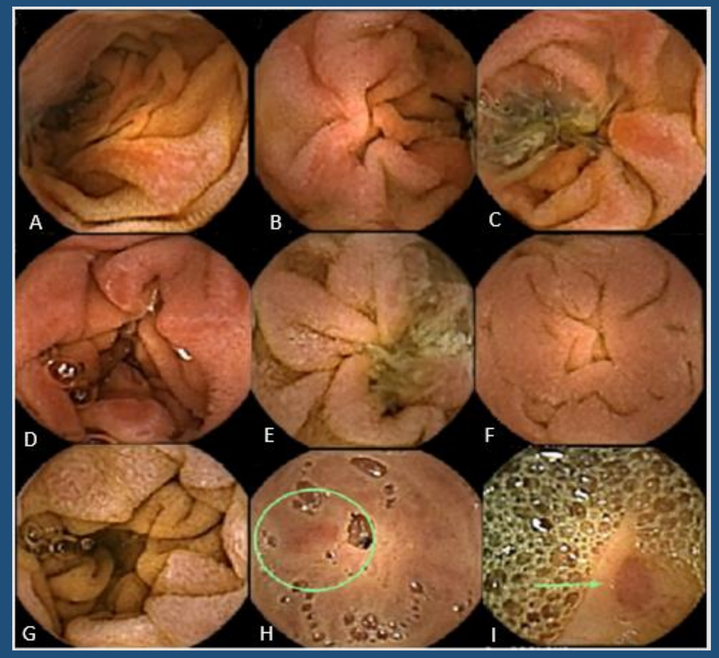
Although SARS-CoV-2 has mainly respiratory manifestations, gastrointestinal symptoms are observed in 30% of cases.
The ACE-2 receptor used by SARS-CoV-2 to infect cells is highly expressed in the brush border of enterocytes.
However, studying the small intestine in live patients is a challenge in the field of clinical research. A minimally invasive alternative for studying the small intestine is the use of capsule endoscopy, which could be useful in the context of COVID-19. Here, **we describe endoscopic changes in the mucosa of the small intestine secondary to severe SARS-CoV-2 infection in hospitalized patients.**

METHODS

We performed a prospective observational study in hospitalized patients with a severe COVID-19 according to NIH guidelines. Participants with a positive COVID-19 PCR from nasopharyngeal swab, hemodynamically stable, able to swallow, and without additional respiratory co-infections, were enrolled between January 27th and May 17th, 2021 at the largest tertiary COVID-19 referral center in Mexico City.
Demographic and clinical characteristics were collected for each participant from clinical files. A PillCam capsule from Medtronic® was used for Capsule Endoscopy (CE). Each capsule study was reviewed separately by two trained endoscopists.
Detection of SARSCoV-2 RNA in stool samples was performed according to CDC guidelines for all participants

RESULTS

Twenty volunteers were enrolled in the study. Diarrhea was the most common gastrointestinal symptom (78%). CE study was normal in 6 participants, while the rest showed at least one intestinal finding. The most frequent finding was shortening or atrophy of villi and hyperemia (45%); followed by red spots (40%), and ulcers (15%). Two participants with shortening or atrophy of villi also presented denuded mucosa. CE findings were observed mainly in duodenum and jejunum. In total, 13 feces were analyzed; most participants showing changes in villi also presented positive SARS-CoV-2 RNA in stool (83)%.



COVID-19 Enteropathy by Capsule endoscopy.
Representative images.
A-D. Denuded mucosa of duodenum.
E-G. Shortening of villi and edema of duodenum mucosa.
H-I Red spots in jejunum mucosa.

Endoscopic Capsule Findings in COVID-19 patients with and without gastrointestinal symptoms (GIS)

	Total (n=20)	GIS- (n=9)	GIS+ (n=11)	p- value Fisher's exact test
Normal n (%)	6 (30%)	3 (33%)	3 (27%)	1
Shortening/Atrophy villi	9 (45%)	4 (45%)	5 (44%)	1
Feces SARS-CoV-2 +	5 (83%)	--	--	--
Feces SARS-CoV-2 -	1 (17%)	--	--	--
Hyperemia	9 (45%)	4 (45%)	5 (44%)	1
Red spots	8 (40%)	6 (66%)	2 (18%)	0.065
Ulcers	3 (15%)	1 (11%)	2 (18%)	1
Edema	2 (10%)	0 (0%)	2 (18%)	0.48
Denuded mucosa	2 (10%)	0 (0%)	2 (18%)	0.48
Active Bleeding	1 (5%)	0 (0%)	1 (9%)	0.45

Demographic and clinical characteristics of the study participants

	Total (n=20)	GIS+ (n=11)	GIS- (n=9)	p-value
Gender, n (%) Male	9 (45%)	4 (36%)	5 (55%)	0.65[a]
Female	11 (55%)	7 (64%)	4 (44%)	
Age, median [IQR][b]	52 [37 - 60]	56 [38 – 56]	48 [34 – 61]	0.56
BMI, median [IQR][b]	29 [27 - 31]	30 [27 - 32]	29 [25 - 30]	0.47
Comorbidities, n (%)[a]				
Arterial hypertension	7 (35%)	6 (55%)	1 (11%)	0.07
Diabetes Mellitus	3 (15%)	2 (18%)	1 (11%)	1
Heart disease	1 (11%)	0 (0%)	1 (11%)	0.45
Hypothyroidism	1 (11%)	1 (9%)	0 (0%)	1
Allergies	2 (22%)	2 (18%)	0 (0%)	0.48
Any comorbidity	9 (45%)	6 (55%)	3 (33%)	0.40
Clinical Symptoms, n (%)				
Diarrhea	8 (72%)	8 (72%)	NA	--
Abdominal Pain	4 (36%)	4 (36%)	NA	--
Nausea	3 (27%)	3 (27%)	NA	--
Vomiting	2 (18%)	2 (18%)	NA	--
GI Bleeding	0 (0%)	0 (0%)	NA	--
Dysgeusia	0 (0%)	0 (0%)	NA	--
Disease Outcome, n (%)[a]				
Improvement	19 (95%)	10 (91%)	9 (100%)	0.45
Death	1 (5%)	1 (9%)	0 (0%)	
Inpatient days, median [IQR][a]	8 [6 - 14]	7 [5 – 9]	14 [9 – 16]	0.83
Respiratory support, n (%)[a]				
Post- Ventilator mechanical support	3 (15%)	1 (9%)	2 (22%)	0.56
High-flow nasal cannula	10 (50%)	7 (64%)	3 (33%)	0.37
Nasal prongs	6 (30%)	3 (27%)	3 (33%)	1
Oxygen mask	1 (5%)	0 (0%)	1 (11%)	0.45

CONCLUSIONS

- We observed that macroscopic changes in the small intestine mucosa, specifically in villi, occurred frequently in severe COVID-19 patients.
- These changes were accompanied by the presence of SARS-CoV-2 RNA in stool.
- We proposed the term **COVID-19 Enteropathy** to encompass findings in intestinal villi (shortening/atrophy/denuded mucosa) and in intestinal mucosa (redness, hyperemia, ulcer) at the same patient.
- Further studies are warranted to establish mechanisms of SARS-CoV-2-associated gastrointestinal disease.

Author Contact Information: fernanda.torres@cieni.org.mx