ACG International Webinar Series:
GI Manifestations of COVID-19

Hosted by Federação Brasileira de Gastroenterologia

Speaker:
Brennan Spiegel, MD, MSHS
Professor of Medicine and Public Health
Director of Health Services Research, Cedars-Sinai
Editor-in-Chief, Am J of Gastroenterology

Moderator:
Wilson Catapani, MD, PhD, FACG
ACG Governor for Brazil

ACG MEMBERSHIP BENEFITS

ACG is a community of over 15,000 GI professionals from around the world who are committed to providing quality care.

Free Subscription to The American Journal of Gastroenterology
Complimentary registration to the ACG Annual Scientific Meeting and dedicated International Reception
Discount registration on ACG’s Annual Postgraduate Course and other ACG courses
Complimentary access to the online ACG Education Universe
Member only access to ACG’s Online Communities the Circles. Topics include: GI, Hepatitis, ACG & CCFA IBD, Functional GI Health and Nutrition, and Women in GI

BENEFITS SPECIFICALLY DESIGNED FOR INTERNATIONAL MEMBERS

International Relations Committee
ACG Governors in Brazil, Central America, India, Italy, Japan, Mexico, Pakistan, Portugal, the United Kingdom, and the West Indies
International GI Training Grant
International Leadership Award
ACG-sponsored faculty at international GI meetings

Become a Member: GI.ORG/JOIN-ACG
ACG International Webinar Series
Join us for an upcoming webinar!

May
Guidelines for IBS - Hosted by Central American GI Society
Speaker: Brian Lacy, MD, PhD
Moderator: Dr. Joaquin Ligorria
Date: Thursday, May 20th at 6:00 pm EST

June
Hepatocellular Carcinoma – Hosted by Pakistan Society for the Study of Liver Diseases
Speaker: Patricia D. Jones, MD, MSCR
Moderator: Dr. Zaigham Abbas
Date: Saturday, June 5th at 12:00 pm EST

Visit https://gi.org/education/international-virtual-grand-rounds/ to Register

Participating in the Webinar

All attendees will be muted and will remain in Listen Only Mode.

Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.
Gastrointestinal Manifestations of COVID-19
Latest Data on Symptoms, Stool Testing, and Clinical Outcomes

Brennan Spiegel, MD, MSHS, FACP, AGAF
Professor of Medicine and Public Health
Director of Health Services Research, Cedars-Sinai
Editor-in-Chief, Am J of Gastroenterology

Clinical Characteristics of Coronavirus Disease 2019 in China

were fever (43.8% on admission and 88.7% during hospitalization) and cough (67.8%). Diarrhea was uncommon (3.8%). The median incubation period was 4 days (interquartile range, 2 to 7). On admission, ground-glass opacity was the most common radiologic finding. Diarrhea was uncommon (3.8%). Gastroenterologic disease and symptoms were present in 83.2% of the patients on admission.
My Symptoms Didn't Seem to Match Coronavirus. But I Tested Positive

As it turns out, a lot of people don't have the symptoms that are considered standard.

By Jordan Davidson

Mar 25, 2020, 7:22am • Share • Tweet • Snap
Any digestive symptom = 50.5%
Around 1 in 5 with diarrhea
GI patients experienced delayed diagnosis because virus not initially expected

It was reported that many medical staff in China were infected at the beginning of the epidemic. Although this was related to improper protection of medical personnel early on, it may also have resulted from failing to consider COVID-19 in the face of atypical extrapulmonary symptoms, especially those with digestive symptoms at the beginning of the outbreak.
Any digestive symptom = 32% (n=116)
Diarrhea = 12%
All had concurrent respiratory symptoms

Any digestive symptom = 61% (n=318)
Diarrhea = 34%
GI was predominant complaint in 20%
GI was initial complaint in 14%
Patients in China have a higher prevalence of fever and cough.

Patients outside of China have higher prevalence of diarrhea (9% vs. 17%).
TRACING SYMPTOMS
On 7 April, around 80% of app users who tested positive for COVID-19 and reported symptoms had lost their sense of smell.

- Anosmia (loss of smell)
- Cough
- Fatigue
- Diarrhoea
- Shortness of breath
- Fever

Number of people reporting each combination of symptoms

Meni et al. MedRxiv (pre-print)
Bowel wall abnormalities seen in 31% of CT scans

Abnormalities associated with ICU admission

Bowel findings included pneumatosis or portal venous gas in 20% of ICU patient CT scans

Digestive Symptoms in COVID-19 Patients With Mild Disease Severity: Clinical Presentation, Stool Viral RNA Testing, and Outcomes

Because COVID-19 testing has largely focused on patients with respiratory symptoms—not digestive symptoms—it is possible that there is a large cohort of undiagnosed patients with low severity illness but with digestive symptoms, such as diarrhea, who unknowingly spread the virus. In this study, we sought to better understand the prevalence and clinical characteristics of this important COVID-19 subgroup with digestive symptoms and mild disease.
In respiratory + GI group, 19% had diarrhea as first symptom
Diarrhea lasted 5 days on average
Diarrhea ranged from 1-14 days
Average of 4 BMs per day
Diarrhea accompanied by fever in 73%
GI patients took 7-9 days longer to achieve viral clearance

DIARRHEA MAY BE FIRST OR ONLY CORONAVIRUS SYMPTOM IN COVID-19 PATIENTS EXPERIENCE, STUDY SUGGESTS
BY KASHMIRA GANDER ON 4/2/20 AT 8:07 AM EDT
Diarrhea, nausea or vomiting may be first coronavirus symptoms in some patients

Some people may have the “gastrointestinal version” of COVID-19.

Early May: CDC Acknowledges GI Symptoms Occur in COVID-19, but are “Less Common”

Watch for symptoms

People with COVID-19 have had a wide range of symptoms reported - ranging from mild symptoms to severe illness.

Symptoms may appear 2-14 days after exposure to the virus. People with these symptoms may have COVID-19:

- Cough
- Shortness of breath or difficulty breathing
- Fever
- Chills
- Muscle pain
- Sore throat
- New loss of taste or smell

Children have similar symptoms to adults and generally have mild illness.

This list is not all inclusive. Other less common symptoms have been reported, including gastrointestinal symptoms like nausea, vomiting, or diarrhea.
Late June: CDC Move GI Symptoms Into Main List of COVID-19 Symptoms

Watch for symptoms

People with COVID-19 have had a wide range of symptoms reported – ranging from mild symptoms to severe illness. Symptoms may appear 2-14 days after exposure to the virus. People with these symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

Gi Symptoms added by CDC

This list does not include all possible symptoms. CDC will continue to update this list as we learn more about COVID-19.

THE LANCET
Gastroenterology & Hepatology

Prolonged presence of SARS-CoV-2 viral RNA in faecal samples

Yongjian Wu • Cheng Guo • Lantian Tang • Zhongsi Hong • Jianhui Zhou • Xin Dong • et al. Show all authors

Published: March 19, 2020 • DOI: https://doi.org/10.1016/S2468-1253(20)30083-2
we observed that for over half of patients, their faecal samples remained positive for SARS-CoV-2 RNA for a mean of 11.2 days after respiratory tract samples became negative for SARS-CoV-2 RNA, implying that the virus is actively replicating in the patient’s gastrointestinal tract and that faecal-oral transmission could occur after viral clearance in the respiratory tract.
Pre-Test Probability

Test

Post-Test Probability

Bayes' Theorem

Sethuraman et al. JAMA (in press)
COVID-19

Select Days of Symptoms: 5

Sensitivity: 0.8485
Specificity: 0.99 (percent)

Select Pretest Probability: 50%

Medium - mix of typicaltypical presentation, high community prevalence

SARS-CoV2 nasopharyngeal PCR
Chance your patient has COVID-19 (pretest probability):
Positive test result: 98.8%
Negative test result: 13.3%

Bayesian calculator using a test sensitivity based on the best currently available data on sensitivity over time, and specificity of 99% based on average reported specificity.
Test characteristics will be updated as more data becomes available.
References
Please send feedback and suggestions to dxgnosis.com
© 2020
Why is the stool positive?

Is the stool infectious?

What should we do about it?

In studies in humans, tissue samples from 15 organs have shown that ACE2 is expressed broadly, including in the heart and kidneys, as well as on the principal target cells for SARS-CoV-2 (and the site of dominant injury), the lung alveolar epithelial cells.\(^\text{17}\)

Expression of ACE2 in Different Organs

Case Report

- 73-year-old man with COVID-19 pneumonia in ICU
- Developed GI bleeding
- Pan-endoscopy found esophageal source
- Biopsies obtained throughout GI tract and tested for ACE2 and viral nucleocapsid protein (NP)
• Grew human small intestinal organoids (hSIOs) from adult stem cells
• Exposed hSIOs to SARS-CoV-2
• Stained for viral RNA, nucleocapsid protein, and visualized proliferating cells
• Found evidence of invasion and rapid viral proliferation within enterocytes

But how does SARS-Co-V2 get into the GI tract in the first place?

And doesn’t gastric acid kill it before it enters the duodenum?
Consistent Detection of 2019 Novel Coronavirus in Saliva

Darnell et al.

Infectious Diseases Society of America

The 2019 novel coronavirus (2019-nCoV) was detected in the self-collected saliva of 91.7% (11/12) of patients. Serial saliva viral load monitoring generally showed a declining trend. Live virus was detected in saliva by viral culture. Saliva is a promising noninvasive specimen for diagnosis, monitoring, and infection control in patients with 2019-nCoV infection.
Systematic review: the use of proton pump inhibitors and increased susceptibility to enteric infection

C. Bavishi* & H. L. DuPont*1,†,§

---

Increased Risk of COVID-19 Among Users of Proton Pump Inhibitors

Christopher V. Almaria, MD, MSHP²; William D. Chey, MD²,³;
Brennan M.R. Spiegel, MD, MSHP²,⁴,⁶

---

TABLE 2. Results from the multivariable logistic regression model on reporting a positive COVID-19 test (N=53,130)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Positive COVID-19 test (n=3,386)</th>
<th>aOR [95% CI]*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPI exposure:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No current PPI use</td>
<td>752 (2.1)</td>
<td>Reference</td>
</tr>
<tr>
<td>Once daily PPI use or less</td>
<td>2,436 (16.4)</td>
<td>2.15 [1.90–2.44]</td>
</tr>
<tr>
<td>Twice daily PPI use</td>
<td>198 (11.7)</td>
<td>3.67 [2.93–4.60]</td>
</tr>
<tr>
<td>H2RA exposure:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No current H2RA use</td>
<td>2,828 (6.3)</td>
<td>Reference</td>
</tr>
<tr>
<td>Once daily H2RA use or less</td>
<td>415 (5.6)</td>
<td>0.85 [0.74–0.99]</td>
</tr>
<tr>
<td>Twice daily H2RA use</td>
<td>143 (12.4)</td>
<td>0.86 [0.66–1.11]</td>
</tr>
</tbody>
</table>

*Adjusted for age, gender, race, education, income, smoking status, alcohol use, BMI, diabetes, hypertension, and chronic kidney disease.

†Adjusted for age, gender, race, education, income, smoking status, alcohol use, BMI, diabetes, hypertension, and chronic kidney disease.
A Meta-Analysis and Systematic Review of the Efficacy of Twice Daily PPIs versus Once Daily for Treatment of Gastroesophageal Reflux Disease

Hongying Zhang,1,2 Zhipei Yang,1 Zhen Ni,1 and Yongquan Shi1

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>PPI twice daily</th>
<th>PPI once daily</th>
<th>Weight</th>
<th>Odds ratio</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events Total</td>
<td>Events Total</td>
<td>M-H, random, 95% CI</td>
<td>M-H, random, 95% CI</td>
<td></td>
</tr>
<tr>
<td>Vellidis et al. 2010</td>
<td>21 25</td>
<td>22 25</td>
<td>6.8%</td>
<td>0.72 (0.14-3.50)</td>
<td></td>
</tr>
<tr>
<td>Fan et al. 2006</td>
<td>100 168</td>
<td>96 150</td>
<td>33.9%</td>
<td>0.98 (0.63-1.52)</td>
<td></td>
</tr>
<tr>
<td>Orlando et al. 2010</td>
<td>55 126</td>
<td>47 121</td>
<td>30.6%</td>
<td>1.14 (0.69-1.90)</td>
<td></td>
</tr>
<tr>
<td>Kimoshita and Hongo 2012</td>
<td>80 113</td>
<td>58 113</td>
<td>28.8%</td>
<td>2.30 (1.13-3.98)</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>254 432</td>
<td>223 419</td>
<td>100.0%</td>
<td>1.29 (0.82-2.02)</td>
<td></td>
</tr>
</tbody>
</table>

Total events |
Heterogeneity: \( I^2 = 54\% \)

Test for overall effect: \( Z = 1.09 (P = 0.27) \)

Letter to the Editor

Treatment with proton pump inhibitors increases the risk of secondary infections and ARDS in hospitalized patients with COVID-19: coincidence or underestimated risk factor?

Composite endpoint 2 of COVID-19

| Current PPI users | 534 | 1.79 (1.30 to 3.10) |
| Short term use (< 30 days) | 442 | 1.90 (1.46 to 2.77) |
| Long term use (≥ 30 days) | 359 | 1.35 (0.91 to 2.26) |
| Past PPI users | 296 | 1.18 (0.27 to 5.13) |
Severe clinical outcomes of COVID-19 associated with proton pump inhibitors: a nationwide cohort study with propensity score matching

Seung Won Lee,¹ Eun Kyo Ha,² Abdullah Özgür Yeniola,³ Sung Yong Moon,¹ So Young Kim,¹ Hyun Yong Koth,² Jee Myung Yang,³ Su Jin Jeong,¹ Sun Joan Moon,⁴ Joo Young Cho,⁵ In Kyung Yoo,⁶ Dong Koon Yun,⁷ ² ⁵ ⁶ ⁷

Composite endpoint 1 of COVID-19
Current PPI users 534 1.63 (1.03 to 2.53)
Short term use (≤ 30 days) 442 1.77 (1.29 to 2.40)
Long term use (≥ 30 days) 359 1.35 (0.90 to 2.00)
Past PPI users 296 0.98 (0.60 to 1.57)

Composite endpoint 2 of COVID-19
Current PPI users 554 1.79 (1.30 to 2.48)
Short term use (≤ 30 days) 442 1.90 (1.46 to 2.47)
Long term use (≥ 30 days) 359 1.23 (0.91 to 1.66)
Past PPI users 296 1.18 (0.72 to 1.91)

Number in bold indicate significant differences (P < 0.05).

The influence of pH on SARS-CoV-2 infection and COVID-19 severity


doi: https://doi.org/10.1101/2020.09.10.20179135
Use of proton pump inhibitors and risk of adverse clinical outcomes from COVID-19: a meta-analysis

C. S. Kow, S. S. Hasan
**Famotidine Use is Associated with Improved Clinical Outcomes in Hospitalized COVID-19 Patients: A Retrospective Cohort Study**


doi: https://doi.org/10.1101/2020.05.01.20086694

**THE LANCET**  
Gastroenterology & Hepatology

**COMMENT | VOLUME 5, ISSUE 4, P335-337, APRIL 01, 2020**

**Enteric involvement of coronaviruses: is faecal–oral transmission of SARS-CoV-2 possible?**

Charleen Yeo  •  Sanghvi Kaushal  •  Danson Yeo

Published: February 19, 2020  •  DOI: https://doi.org/10.1016/S2468-1253(20)30048-0  •  Check for updates
Concentration and detection of SARS coronavirus in sewage from Xiao Tang Shan Hospital and the 309th Hospital of the Chinese People's Liberation Army.


In this study, we found that the virus can survive for 14 days in sewage at 4 degrees C, 2 days at 20 degrees C, and its RNA can be detected for 8 days though the virus had been inactivated. In conclusion, this study demonstrates that the RNA of SARS-CoV could be detected from the concentrates of sewage of both hospitals receiving SARS patients before disinfection and occasionally after disinfection though there was no live SARS-CoV, thus much attention should be paid to the treatment of stools of patients and the sewage of hospitals receiving SARS patients.

Los Angeles Times

Poop may tell us when the coronavirus lockdown will end
Air, Surface Environmental, and Personal Protective Equipment Contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) From a Symptomatic Patient

Sean Wei Xiang Ding, MBBS\(^5\); Yan Kim Tan, PhD\(^3\); Po Ying Chiu, MBBS\(^1\); et al.

There was extensive environmental contamination by 1 SARS-CoV-2 patient with mild upper respiratory tract involvement. Toilet bowl and sink samples were positive, suggesting that viral shedding in stool\(^5\) could be a potential route of transmission. Postcleaning samples were negative, suggesting that current decontamination measures are sufficient.
EMERGING INFECTIOUS DISEASES®

Volume 26, Number 8—August 2020

Infectious SARS-CoV-2 in Feces of Patient with Severe COVID-19

Fei Xiao1, Jing Sun1, Yonghao Xu1, Fang Li1, Xiaofang Huang1, Heying Li1, Jingxian Zhao1, Jicheng Huang1, and Jincun Zhao2

Author affiliations: Sun Yat-sen University, Zhuhai, China (F. Xiao); Guangzhou Medical University, Guangzhou, China (J. Sun, Y. Xu, F. Li, X. Huang, J. Zhao, J. Zhao); Chinese Academy of Sciences, Guangzhou (H. Li); Guangzhou Customs District Technology Center, Guangzhou (J. Huang).

Suggested citation for this article

Abstract

Severe acute respiratory syndrome coronavirus 2 was isolated from feces of a patient in China with coronavirus disease who died. Confirmation of infectious virus in feces affirms the potential for fecal-oral or fecal-respiratory transmission and warrants further study.

CORRESPONDENCE

Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1

Aerosols

A. Titers of Viable Virus

B. Predicted Decay of Virus Titer

0 10 20 30

Titer (TCID₅₀/μl of air)

Hours
Can a toilet promote virus transmission? From a fluid dynamics perspective

Physiology of Fluids 32, 043007 (2020); https://doi.org/10.1063/5.0013138

---

Probable Evidence of Fecal Aerosol Transmission of SARS-CoV-2 in a High-Rise Building

Annals of Internal Medicine

---

American College of Gastroenterology
How to clean your bathroom to protect against coronavirus

By Ryan Prior, CNN

Updated 3:56 PM ET, Mon, April 20, 2020

If you have fever and diarrhea...

- self-isolate
- call your doctor
- close toilet lid
- clean toilet seat
- clean toilet handle
- don’t share toilet paper
- clean your hands

Brennan Spiegel, MD, MSHS

Chief Editor, Gastrointestinal Endoscopy
Professor of Medicine and Public Health
Thank you

For latest on GI COVID: @BrennanSpiegel