Prevalence, risk factors and clinical outcomes of COVID-19 in patients with a history of pancreatitis in Northern California

Zhang *et al* recently described ACE2 expression along the GI tract and suggests the digestive system as a potential route for COVID-19.[1] ACE2 is also expressed in the pancreas[2] and lipase elevations, suggestive of pancreatic involvement, have been reported among patients with COVID-19.[3] A recent case report[4] demonstrated that severe pancreatitis may occur in COVID-19. However, the clinical implications of these findings with regards to COVID-19 susceptibility among patients with prior pancreatitis are unclear.

In this retrospective study, we explored the prevalence, risk factors and outcomes of COVID-19 among patients with a history of pancreatitis. Consecutive patients whose severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA testing was performed at Stanford between 4 March 2020, and 14 April 2020 (Institutional Review Board (IRB) protocol 55975) and had a history of acute (K85) or chronic pancreatitis (K86) were included. We performed univariate and multivariate logistic regression to determine predictors of COVID-19 among patients with prior pancreatitis (Stata/IC V.15.1 for Windows).

A total 14 235 individuals were tested for SARS-CoV-2 at our institution of which 0.7% (102/14 235) had a history of acute or chronic pancreatitis. Table 1 summarises baseline clinical characteristics. In this cohort, 85.3% had a history of acute pancreatitis while 14.7% had chronic pancreatitis. Common aetiologies of pancreatitis (for both acute and chronic cases) were idiopathic (42.2%), gallstone (29.6%), alcohol (12.7%) and drug induced (6.9%). Common presenting symptoms included cough (52.9%), nasal congestion (34.3%), dyspnoea (33.3%) and fever (35.3%). The prevalence of COVID-19 among patients with prior pancreatitis was 7.8% (8/102). Of these eight, six had prior acute pancreatitis and two had chronic pancreatitis. There was no difference with regards to obesity, smoking status, alcohol use, diabetes mellitus, ACE inhibitor or angiotensin receptor blocker use between patients with or without COVID-19. Patients with COVID-19 were more likely to have baseline hypertension (75.0% vs 28.7%, p=0.007) and be on antiplatelet therapy (25.0% vs 5.3%, p=0.036) compared with COVID-19 negative patients. In univariate analysis, Asian ethnicity (OR 6.45, p=0.023), prior COVID-19 exposure (OR 7.31, p=0.019), prior idiopathic pancreatitis (OR 11.28, p=0.026) and hypertension (OR 7.44, p=0.018) were associated with increased risk of COVID-19. In multivariate analysis, Asian ethnicity (OR 8.87, p=0.042), idiopathic pancreatitis (OR 27.15, p=0.026) and hypertension (OR 17.19, p=0.008) were independently associated with increased risk of COVID-19. No patients with a history of pancreatitis with COVID-19 developed acute pancreatitis. Among patients with COVID-19, 37.5% required hospitalisation. One patient died of acute respiratory distress syndrome, septic shock and multiorgan failure.

To our knowledge, this is the first study to evaluate the prevalence and outcomes of COVID-19 among patients with a history of pancreatitis. The prevalence of COVID-19 among patients with prior pancreatitis is 7.8% which is greater than the population-weighted prevalence of SARS-CoV-2 positive serology in our background population at 2.8%.[5] This suggests that patients with a history of pancreatitis may be more susceptible to COVID-19. Our study also suggests COVID-19 may not lead to increased risk of SARS-CoV-2 pancreatic inflammation as none of our patients with prior pancreatitis developed acute pancreatitis. Our results may help clinicians risk stratify patients and highlights the need for future mechanistic studies to understand the role of prior pancreatitis in mediating the risk of SARS-CoV-2 infection.

John Gubatan ,[1] **Steven Levitte**,[2] **Akshar Patel**,[1] **Tatiana Balabanis**,[1] **Arpita Sharma**,[1] **Elaina Jones**,[1] **Bomi Lee**,[1] **Murli Manohar**,[1] **Gayathri Swaminathan**,[1] **Walter Park** ,[1] **Aida Habtezion** [1]

[1]Divison of Gastroenterology and Hepatology, Stanford University School of Medicine, Stanford, California, USA

Table 1 Baseline clinical characteristics of patients with prior pancreatitis tested for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

Clinical variables	All prior pancreatitis Patients (n=102)	SARS-CoV-2 RNA Negative (n=94)	SARS-CoV-2-RNA Positive (n=8)	P value
Demographics				
Age, years (SD)	55.3 (±18.7)	54.2 (±18.5)	69.3 (±16.4)	0.039
Male gender, n (%)	41 (40.2)	35 (37.2)	6 (75.0)	0.036
Asian ethnicity, n (%)	11 (10.8)	8 (8.5)	3 (37.5)	0.011
History of pancreatitis				
Acute, total, n (%)	87 (85.3)	81 (86.2)	6 (75.0)	0.392
Chronic, total, n (%)	15 (14.7)	13 (13.8)	2 (25.0)	0.334
Aetiology of pancreatitis				
Idiopathic, n (%)	43 (42.2)	36 (38.3)	7 (87.5)	0.007
Gallstone, n (%)	30 (29.4)	29 (30.9)	1 (12.5)	0.274
Alcohol, n (%)	13 (12.7)	13 (13.8)	0 (0.0)	0.260
Drug induced, n (%)	7 (6.9)	7 (7.4)	0 (0.0)	0.424
Autoimmune, n (%)	4 (3.9)	4 (4.3)	0 (0.0)	0.552
Hypertriglyceridaemia, n (%)	1 (1.0)	1 (1.1)	0 (0.0)	0.768
Post-ERCP, n (%)	3 (2.9)	3 (3.2)	0 (0.0)	0.608
Cystic fibrosis, n (%)	2 (2.0)	2 (2.1)	0 (0.0)	0.769

ERCP, endoscopic retrograde cholangiopancreatography.

[2]Department of Pediatrics, Stanford University School of Medicine, Stanford, CA, USA

Correspondence to Dr John Gubatan, Divison of Gastroenterology and Hepatology, Stanford University School of Medicine, Stanford, CA 94063, USA; jgubatan@stanford.edu

Twitter John Gubatan @JGubatanMD

Contributors JG and AH planned and designed the study and analysed the data. JG, SL, TB, AP and AS performed the literature review and data extraction in chart reviews. JG performed the statistical analyses, drafted the manuscript and had full access to the study data and takes responsibility for the integrity of the data and accuracy of the analysis. AH, EJ, BL, MM, GS and WP provided critical review of the manuscript. All authors interpreted the results and contributed to critical review of the manuscript.

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ORCID iDs
John Gubatan http://orcid.org/0000-0001-6037-2883
Walter Park http://orcid.org/0000-0001-8187-4188
Aida Habtezion http://orcid.org/0000-0002-4473-006X

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