Acute pancreatitis associated with severe acute respiratory syndrome coronavirus-2 infection: a case report and review of the literature

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Abstract

Introduction: We report a case of Severe acute respiratory syndrome coronavirus-2 infection with acute pancreatitis as the only presenting symptom. To the best of our knowledge, there are few case reports of the same presentation.

Case presentation: An otherwise healthy 44-year-old white male from Egypt presented to the hospital with severe epigastric pain and over ten attacks of nonprojectile vomiting (first, gastric content, then bilious). Acute pancreatitis was suspected and confirmed by serum amylase, serum lipase, and computed tomography scan that showed mild diffuse enlargement of the pancreas. The patient did not have any risk factor for acute pancreatitis, and extensive investigations did not reveal a clear etiology. Given a potential occupational exposure, a nasopharyngeal swab for polymerase chain reaction testing for severe acute respiratory syndrome coronavirus 2 was done, which was positive despite the absence of the typical symptoms of severe acute respiratory syndrome coronavirus 2 such as fever and respiratory symptoms. The patient was managed conservatively. For pancreatitis, he was kept nil per os for 2 days and received intravenous lactated Ringer’s (10 ml per kg per hour), nalbuphine, alpha chymotrypsin, omeprazole, and cyclizine lactate. For severe acute respiratory syndrome coronavirus 2, he received a 5-day course of intravenous azithromycin (500 mg per day). He improved quickly and was discharged by the fifth day. We know that abdominal pain is not a rare symptom of severe acute respiratory syndrome coronavirus 2, and we also know that elevated levels of serum amylase and lipase were reported in severe acute respiratory syndrome coronavirus-2 patients, especially those with severe symptoms. However, the association between severe acute respiratory syndrome coronavirus-2 infection and idiopathic acute pancreatitis is rare and has been reported only a few times.

Conclusion: We believe further studies should be conducted to determine the extent of pancreatic involvement in severe acute respiratory syndrome coronavirus-2 patients and the possible causality between severe acute respiratory syndrome coronavirus 2 and acute pancreatitis. We reviewed the literature regarding the association between severe acute respiratory syndrome coronavirus 2 and acute pancreatitis patients. Published data suggest that severe acute respiratory syndrome coronavirus 2 possibly could be a risk factor for acute pancreatitis.

Keywords: Acute pancreatitis, Pancreas, SARS-CoV-2, COVID-19, Case report

Introduction

With over 149 million confirmed cases and 3.14 million deaths worldwide as of 29 April 2021, coronavirus disease 2019 (COVID-19) has declared itself the most significant global health emergency humanity had to face in decades.
[1]. After more than 10 months of the pandemic, we still lack a comprehensive understanding of the virus pathophysiology and how it manifests in different patients. Gastrointestinal (GI) manifestations were reported in about 18% of patients, with diarrhea being the most commonly reported GI symptom [2] that is most likely due to alteration of enterocyte permeability [3]. Mild-to-moderate liver injury was reported as well, and the exact mechanism is still not fully understood [3]. Acute abdominal pain has also been reported, and its exact pathophysiology is still elusive. Acute pancreatitis was reported a few times as a cause of abdominal pain in patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and it is not clear if the virus could involve the pancreas specifically. We are reporting a case of COVID-19 presenting with acute pancreatitis without other risk factors for pancreatitis.

**Case presentation**

A previously healthy 44-year-old white male presented to the emergency department with severe epigastric pain radiating to the back and frequent vomiting (over ten attacks, first gastric content, then bilious with no blood) for 3 days on 22 June 2020. Four days before the beginning of his abdominal symptoms, the patient received a laboratory diagnosis of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) after undergoing a nasopharyngeal swab for reverse-transcription polymerase chain reaction (RT-PCR) to detect SARS-CoV-2 infection as part of surveillance screening after contacting several COVID-19 patients during his work in a hotel in Sharm El-Sheikh, Egypt, and the patient was asked to self-isolate. However, he presented to our care after 5 days of SARS-CoV-2 diagnosis with acute pancreatitis. The patient did not have any respiratory symptoms at that time.

During history taking, the patient denied any respiratory symptoms such as cough or dyspnea. The patient denied smoking, alcohol, or drug intake (illicit or therapeutic except for occasional use of paracetamol for right knee pain). The patient was a middle-class worker who denied exposure to any hazardous substances at his workplace. He also denied any previous similar attacks of abdominal pain. There was no family history of similar attacks. His vital signs were as follows: blood pressure of 94/50 mmHg, pulse rate of 112 beats per minute, respiratory rate of 27 breaths per minute, temperature of 37.5 °C, and oxygen saturation of 98% on room air. Abdominal examination revealed marked tenderness in the epigastric region without distension. Neurological examination did not reveal any abnormalities. Intravenous fluid resuscitation was started immediately with a bolus of 1.5 L of lactated Ringer’s.

A repeat nasopharyngeal Reverse transcription polymerase chain reaction (RT-PCR) was performed on the day of admission to the hospital as a part of the local protocols for suspected cases. The results came back positive on 24 June 2020. The patient was then transferred from the medical ward to an isolation center in the same hospital, explicitly dedicated to COVID-19 patients.

An abdominal X-ray was done and was unremarkable. However, abdominal–pelvic ultrasonography revealed mild diffuse enlargement of the pancreatic head with normal gall bladder and biliary tract. Serum amylase was 773, and serum lipase was 286 (Table 1). The diagnosis of mild acute pancreatitis was confirmed with an abdominal CT scan that revealed mild diffuse enlargement of the pancreas (Figure 1). The patient was managed conservatively for 4 days. For pancreatitis, he was kept NPO for 2 days during which he received 10 ml/kg/hour of lactated Ringer’s; he also received nalbuphine (10–20 mg per day, intramuscular) for analgesia, omeprazole (40 mg once daily, intravenous) for ulcer prophylaxis and cyclizine lactate (50 mg twice daily, intravenous) for vomiting. On the third day, anorexia and vomiting subsided, and the patient was started on oral feeding, which he tolerated well. On the fifth day, the patient was vitally stable and symptom-free and was advised to continue his

| Laboratory results | Normal range |
|--------------------|--------------|
| White cell count (per mm³) | 17,700 | 4000–11,000 |
| WBC differential (per mm³) | 13,140 | 2500–8000 |
| Total neutrophils | 2850 | 1000–4000 |
| Total lymphocytes | 910 | 100–700 |
| Total monocytes | 386,000 | 1,47,000–3,47,000 |
| Platelet count (per mm³) | 176 | 29–33 |
| Alanine aminotransferase (U/L) | 158 | 5–40 |
| Aspartate aminotransferase (U/L) | 222 | 140–280 |
| Total bilirubin (mg/dl) | 39 | 7–20 |
| Direct bilirubin (mg/dl) | 1.07 | 0.8–1.2 |
| Lactate dehydrogenase (U/L) | 0.2 | Less than 0.3 |
| Blood urea nitrogen (mg/dl) | 10–20 |
| Creatinine (μmol/L) | 286 | 0–160 |
| Lipase (U/L) | 1.19 | 0–150 |
| Triglycerides (mg/dl) | 221 | 38 |
| Total cholesterol (mg/dl) | 80–140 |
| C-reactive protein (mg/L) | 151 | Negative |
| Random blood glucose (mg/dl) | Negative |
| Hepatitis A virus serology | Negative |
| Hepatitis B virus serology | Negative |
| Hepatitis C virus serology | Negative |
| Human immunodeficiency virus serology | Negative |
SARS-CoV-2 treatment from home, including ascorbic acid (1 g per day, oral) and zinc sulfate (220 mg per day, oral). Abdominal ultrasound was repeated on discharge and again showed no gallstones. At 30 days follow-up, the patient was well and did not have any complaints.

**Discussion**

Although rare, acute pancreatitis can be caused by viral, bacterial, fungal, and parasitic infections. Viral pancreatitis is known to be caused by mumps, cytomegalovirus, hepatitis B virus, herpes simplex virus, varicella-zoster virus, and human immunodeficiency virus (HIV) [4–6]. Although coronaviruses are not known to cause pancreatitis in humans, the 2003 SARS was associated with damage to the endocrine pancreas and acute diabetes [7]. This effect was explained by damage to acinar cells through the virus binding to angiotensin-converting enzyme 2 (ACE2) receptors [7].

Liu et al. reported elevated amylase and lipase in 16.41% and 1.85% of patients with severe and mild SARS-CoV-2 infections, respectively, suggesting some degree of pancreatic injury [8]. This injury's exact pathophysiology is not well understood, but SARS-CoV-2 may involve the exocrine pancreas in the same manner SARS involves the endocrine pancreas: through ACE2 receptor binding, especially now that we know that SARS-CoV-2 binds ACE2 receptors ten times stronger than the 2003 SARS [9]. A recent study published by Müller et al. found that SARS-CoV-2 has the ability to infect and replicates in β-cell of pancreatic...
Table 2  Published cases of acute pancreatitis associated with SARS-CoV-2 infection

| Author             | Country | Age | Sex | Pulmonary symptoms                      | Extra-pulmonary symptoms | Physical examination findings | Chest CT | Abdominal CT | Serum lipase and serum amylase | Other laboratory test performed to exclude other etiologies | Outcome |
|--------------------|---------|-----|-----|-----------------------------------------|---------------------------|-------------------------------|----------|--------------|--------------------------------|-------------------------------------------------------------|---------|
| Myeres et al. [13] | USA     | 67  | Male| Acute hypoxic respiratory failure       | Acute onset epigastric abdominal discomfort and fever | Epigastric tenderness         | Ground-glass opacity in the right lung apex | L: 5295 U/L | A: not reported | Not done; only SARS-CoV-2 rapid test was positive 3 days after onset of abdominal pain and 2 days after hospitalization | Liver chemistry tests, serum triglycerides, serum immunoglobulin G4 | Alive   |
| Samies et al. [14] | USA     | 15  | Male| Nasal congestion                        | Anosmia, ageusia, vomiting, and abdominal pain | Epigastric tenderness         | Scattered ground-glass opacities in bilateral lung fields | L: 233 U/L (4–39 U/L) | A: not reported | Positive 2 days after onset of abdominal pain and 1 day after hospitalization | Liver chemistry tests, serum triglycerides | Alive   |
| Samies et al. [14] | USA     | 11  | Male| None reported                            | Headache, chills, tactile fever, abdominal pain, hematochezia, and epistaxis | Epigastric tenderness         | Interstitial opacities with peribronchial thickening | L: 582 U/L (4–39 U/L) | A: 156 U/L | Positive on the same day of onset of abdominal pain and 2 days prior to hospitalization | Liver chemistry tests, serum triglycerides (elevated to 251 mg/dl), cholesterol (normal) | Alive   |
| Samies et al. [14] | USA     | 16  | Female| Cough                                   | Subjective fever, nausea, and abdominal pain | Epigastric tenderness         | Not evaluated Hepatomegaly, single gallstone, and prominence of the pancreas | L: 1909 U/L (4–39 U/L) | A: not reported | Positive 1 week prior to onset of abdominal pain | Liver chemistry tests, serum triglycerides, cholesterol | Alive   |
| Fernandes et al. [15] | Brazil | 36  | Female| Dyspnea                                 | Fever, headache, and abdominal pain | Not reported Bilateral pulmonary opacities | Bilateral pulmonary opacities Acute interstitial pancreatitis with acute peripancreatic fluid collection | L: 640 U/L | A: 710 U/L | Positive | None reported | Alive   |
| Author         | Country | Age | Sex  | Pulmonary symptoms                  | Extra-pulmonary symptoms                                      | Physical examination findings | Chest CT                          | Abdominal CT | Serum lipase and serum amylase | SARS-CoV-2 RT-PCR | Other laboratory test performed to exclude other etiologies | Outcome |
|----------------|---------|-----|------|-------------------------------------|----------------------------------------------------------------|-------------------------------|-----------------------------------|---------------|---------------------------------|------------------|--------------------------------------------------------------------------------|---------|
| Lakshmanan et al. [16] | USA     | 68  | Male | None reported                       | Loss of appetite, anorexia, nausea, and vomiting                | Dehydration, lethargy, and soft, nontender abdomen              | Not evaluated                     | Peripancreatic fat stranding, most remarkable around the tail, with mild duodenal wall thickening and adjacent fat stranding, likely from pancreatitis. The gallbladder appeared normal, without wall thickening or surrounding inflammatory changes, and the common bile duct was not dilated. | L: 2035 U/L A: 1030 U/L | Positive 2 days prior to hospitalization and 7 days prior to diagnosis of pancreatitis | Liver chemistry tests, total bilirubin, serum triglycerides, serum calcium | Alive                                |
| Kurihara et al. [17]  | Japan   | 55  | Male | Severe respiratory distress necessitated intubation and ECMO | Could not be evaluated due to sedation                        | Could not be evaluated due to sedation                          | Not evaluated                     | Pancreas with diffuse parenchymal enlargement and stranding of the surrounding retroperitoneal fat | L: 263 U/L (16–55 U/L) A: 252 U/L (44–132 U/L) | Positive on day 8 after respiratory symptom onset | Serum triglycerides (mild elevation), serum calcium | Alive                                |
| Alves et al. [18]     | Brazil  | 56  | Female | Dry cough and dyspnea               | General malaise and epigastric pain                             | Not reported                                                   | Multiple ground-glass opacities, interlobular septal thickening, and consolidation areas | L: 2993 U/L A: 544 U/L | Positive | Serum triglycerides (209 mg/dl), serum calcium (1.24 mg/dl) | Alive                                |
| Author                  | Country | Age | Sex | Pulmonary symptoms                          | Extra-pulmonary symptoms                                                                 | Physical examination findings                      | Chest CT                                                                 | Abdominal CT                                                                 | Serum lipase and serum amylase | SARS-CoV-2 RT-PCR | Other laboratory test performed to exclude other etiologies | Outcome |
|------------------------|---------|-----|-----|---------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------|-----------------|-----------------------------------------------------------------|----------|
| Wang et al. [19]       | China   | 42  | Male| Chest discomfort and shortness of breath   | Nausea and persistent upper abdominal pain with radiation to the back for 3 days          | Not reported                                    | Multiple ground-glass opacities in both lungs                            | L: 382 U/L (0–180 U/L) A: 132 U/L (0–180)                                  | Positive on day 5 of abdominal pain                                  | Serum triglycerides: 3.2 mmol/L, (< 1.7 mmol/L), Serum calcium        | Dead      |
| Wang et al. [19]       | China   | 35  | Male| None reported                               | Five days of persistent upper abdominal pain with radiation to the back, nausea, and vomiting | Not reported                                    | Patchy shadows in the lower right lung and bilateral pleural effusion   | L: 1042 U/L (0–180 U/L) A: normal                                      | Positive on day 6 of abdominal pain                                  | Serum triglycerides: 3.97 mmol/L, (< 1.7 mmol/L), Serum calcium        | Alive     |
| Patnaik et al. [20]    | India   | 29  | Male| Dyspnea                                     | Acute diffused abdominal pain of 5 days duration that radiated to the back and progressively worsened and low-grade fever | Abdominal tenderness maximal in the umbilical region | Not evaluated                                                   | Swollen pancreas L: 1650 U/L A: 2861 U/L                                  | Positive                                                | Serum triglycerides, serum calcium                                     | Alive     |
| Kumaran et al. [21]    | UK      | 67  | Female| None reported                               | Epigastric pain, diarrhea, and vomiting                                                  | Not reported                                    | Necrotizing pancreatitis L: not evaluated A: 1483 U/L                    | Positive                                                                 | Liver chemistry tests, serum triglycerides, serum calcium, immunoglobulin G4 | Alive   |
| Gonzalo-Voltas et al. [22] | Spain  | 76  | Female| None reported                               | Epigastric pain, fever, vomiting, and diarrhea                                            | Not reported                                    | Interstitial edematous pancreatitis L: not evaluated A: 3568 IU/L         | Positive                                                                 | None reported                                         | Alive   |
| Author            | Country | Age | Sex | Pulmonary symptoms                      | Extra-pulmonary symptoms                          | Physical examination findings | Chest CT | Abdominal CT | Serum lipase and serum amylase | SARS-CoV-2 RT-PCR | Other laboratory test performed to exclude other etiologies | Outcome |
|-------------------|---------|-----|-----|----------------------------------------|-------------------------------------------------|-------------------------------|----------|--------------|--------------------------|------------------|-------------------------------------------------------------------------|---------|
| Cheung et al.     | USA     | 38  | Male| None reported                           | Fever and epigastric pain                        | Not reported                  | Not evaluated | Not evaluated | L: 10,255 U/L            | Positive         | Liver chemistry tests, serum triglycerides, serum calcium, serum bilirubin | Alive   |
| Kataria et al.    | USA     | 49  | Female| Dry cough, shortness of breath, and hypoxic respiratory failure | Fever, nausea, vomiting, and severe abdominal pain radiating to the back | Not reported                  | Multifocal infiltrates involving the posterior basal segment of the left lower lobe and an apical-posterior segment of the left upper lobe | L: 1451 IU/L (0–160) A: 501 IU/L (30–110) | Positive on the second day of hospitalization | Liver chemistry tests, serum triglycerides, serum calcium, total bilirubin | Alive   |
| Brikman et al.    | Israel  | 61  | Male| Cough, dyspnea, and hypoxemia           | Fever weight loss, and diffuse abdominal tenderness | Soft abdomen with no signs of peritoneal irritation | Not evaluated | Focal parenchymal enhancement of the pancreas head with inflammatory changes in peripancreatic fat | L: 203 U/L (21–67 U/L) A: 142 U/L (28–100 U/L) | Positive | Serum triglycerides 3.18 mmol/L (1.8 mmol/L), direct bilirubin | Alive   |
| Mazrouei et al.   | UAE     | 24  | Male| Mild upper respiratory tract symptoms  | Nonradiating epigastric pain, nausea, and vomiting | Epigastric discomfort on palpation | Not evaluated | Edema of the distal pancreas with surrounding fluid | L: 578 IU/L A: 391 U/L | Positive 1 day prior to presenting to the emergency department | None reported | Alive   |
| Bokhari et al.    | Pakistan| 32  | Male| Sore throat and productive cough        | High fever, chills, severe epigastric pain radiating to back, and nonbilious vomiting | Not reported                  | Not evaluated | Bulky and swollen pancreas with significant peripancreatic inflammatory changes and fluid collection along the gastrosplenic ligament | L: 721 IU/L A: 672 IU/L | Positive 8 days after onset of symptoms. | Liver chemistry tests, serum triglycerides, serum calcium | Alive   |
| Author            | Country   | Age | Sex    | Pulmonary symptoms | Extra-pulmonary symptoms | Physical examination findings | Chest CT | Abdominal CT | Serum lipase and serum amylase | SARS-CoV-2 RT-PCR | Other laboratory test performed to exclude other etiologies | Outcome |
|-------------------|-----------|-----|--------|---------------------|--------------------------|-------------------------------|----------|--------------|--------------------------------|------------------|---------------------------------------------------------------|---------|
| Alloway et al.    | USA       | 7   | Female | None reported       | Fever and abdominal pain  | Distension and tenderness to palpation in the left upper and left lower quadrant, and the epigastric regions | Not evaluated in the second attack (the first attack showed small bilateral pleural effusion) | Not evaluated in the second attack (the first attack showed necrotizing pancreatitis) | L: 676 U/L in the first attack 1672 U/L in the second attack (80–360 U/L) A: not reported | Not done in the first attack Positive in the second attack | Serum LDH                                        | Alive   |
| Rabice et al.     | USA       | 36  | Female | Dry cough and dyspnea | Nausea, vomiting, and epigastric pain | Epigastric tenderness | Not evaluated | Not evaluated | L: 875 U/L A: 88 U/L | Positive | Liver chemistry tests. Serum triglycerides (210 mg/dl) | Alive   |
| Pinte et al. [30] | Romania   | 47  | Male   | Dry cough           | Severe epigastric pain with radiation to the back, nausea, constipation, and lack of flatus | Epigastric tenderness | Scattered bilateral subpleural ground-glass opacities | Blurring of the pancreatic contours due to the edema of the surrounding adipose tissue | Positive | Liver chemistry tests | Alive   |
| Meireles et al.   | Portugal  | 36  | Female | Dry cough, breathlessness, and fever | Nausea, vomiting, and epigastric pain | No physical findings | Bilateral ground-glass opacities with 75–100% lung involvement | No pancreatic abnormalities | L: 631 U/L A: 718 U/L | Positive 4 days after onset of cough | Serum triglycerides, serum cholesterol, serum calcium, ANA screening Anti-HIV 1 and 2, HBs antigen, anti-HCV antibody, anti-Coxsackie antibody (IgM/IgG), anti-herpes virus 1 antibody (IgM/IgG), anti-herpes virus 2 antibody (IgM/IgG), anti-CMV antibody (IgM/IgG) | Alive   |
| Author       | Country | Age | Sex  | Pulmonary symptoms                      | Extra-pulmonary symptoms                  | Physical examination findings | Chest CT                        | Abdominal CT | Serum lipase and serum amylase | SARS-CoV-2 RT-PCR | Other laboratory test performed to exclude other etiologies | Outcome       |
|--------------|---------|-----|------|-----------------------------------------|-------------------------------------------|-------------------------------|---------------------------------|----------------|--------------------------------|------------------|--------------------------------------------------------------------------------|---------------|
| Miao et al.  | France  | 26  | Female | None reported                          | Fever, epigastric pain, and severe vomiting | Not reported                  | Bilateral basal condensations and pleural effusions | Enlarged pancreas gland without any structural abnormality | L: 211 U/L | A: not reported                  | Positive        | Liver chemistry tests, serum triglycerides, serum calcium, serological tests for human immunodeficiency virus, hepatitis B and C, Coxsackie viruses, Chlamydia, Mycoplasma, antinuclear and anti-DNA antibodies | Alive         |
| Aloysius et al. | USA | 36  | Female | Dry cough and progressive dyspnea       | Fevers, stabbing epigastric pain, vomiting, and diarrhea | Severe epigastric tenderness | Multifocal bilateral ground-glass opacities | Normal | L: 627 U/L A: 325 U/L | Positive        | Liver chemistry test, serum triglycerides, serum procalcitonin, total and direct bilirubin | Unknown       |
| Hadi et al.  | Denmark | 47  | Female | Acute respiratory distress              | None reported                             | Not reported                  | Not evaluated                  | Not evaluated                  | L: not evaluated A: more than 1500 U/L | Positive        | Serum triglycerides, serum calcium | Still in ICU    |
| Hadi et al.  | Denmark | 68  | Female | Dyspnea and hypoxia that necessitated intubation and mechanical ventilation | Abdominal pain                             | Epigastric tenderness        | Not evaluated                  | Not evaluated                  | L: not evaluated A: 934 U/L | Positive        | Serum triglycerides, serum calcium | Still in ICU    |
| Author          | Country | Age | Sex | Pulmonary symptoms                      | Extra-pulmonary symptoms                                                                 | Physical examination findings | Chest CT | Abdominal CT | Serum lipase and serum amylase | SARS-CoV-2 RT-PCR | Other laboratory test performed to exclude other etiologies | Outcome |
|-----------------|---------|-----|-----|-----------------------------------------|------------------------------------------------------------------------------------------|--------------------------------|----------|--------------|-------------------------------|-----------------|--------------------------------------------------------------------------------|---------|
| Anand et al.    | UK      | 59  | Female | Cough and sore throat                  | Fever, myalgia, abdominal pain, and constipation                                           | Not reported                  | Not evaluated | L: not evaluated            | Positive                      | None reported                                                | Alive    |
| Hassani et al.  | Iran    | 78  | Female | None reported                          | Severe positional epigastric pain precipitated by lying supine, nausea, vomiting, and chills with no fever | Epigastric tenderness         | Patchy peripheral ground glass infiltrations in both lungs | Not evaluated | L: 230 IU/L, A: 185 IU/L         | Positive                      | Liver chemistry tests, lipids profile, serum electrolytes               | Alive    |
| Kandasamy et al. | India  | 45  | Female | None reported                          | Severe sharp epigastric pain radiating to the back                                           | Severe epigastric tenderness  | Multifocal areas of ground-glass opacities, consistent with CO-RADS score of 5 | Diffusely enlarged pancreas with acute peripancreatic and pararenal collections | L: 293 IU/L, A: 364 IU/L         | Positive                      | Liver chemistry, total bilirubin, gamma-glutamyltransferase, alkaline phosphatase | Alive    |

L, serum lipase; A, serum amylase.
islets of Langerhans as they detected SARS-CoV-2 nucleocapsid protein in the pancreatic cells of post-mortem patients [10]. Their findings may explain the reason behind the metabolic dysregulations of COVID-19 patients, such as impaired glucose homeostasis and abnormal amylase or lipase levels [8].

We report the first African case report of acute pancreatitis presenting as SARS-CoV-2 infection. Our patient had acute acalculous pancreatitis in association with SARS-CoV-2 infection. We managed to exclude alcoholism, drugs, hypertriglyceridemia, hypercalcemia (by laboratory testing), and trauma (by history) as potential etiologies. The patient denied any previous attacks or family history of similar symptoms. We did not test our patient for autoimmune pancreatitis since this was not feasible at our institution. Also, we did not test for viral causes of pancreatitis other than hepatitis B virus and human immunodeficiency virus, which both were negative.

We searched the literature in PubMed/Medline up to 3 January 2021 to identify published case reports of COVID-19 associated with pancreatitis. We identified only 29 cases published in 25 articles (Table 2). SARS-CoV-2 infections were diagnosed with RT-PCR in all cases except one case with antibody testing. Three cases were in the pediatric age group < 18 years. Including our case, patients have a mean age of 43.5 years, and 14 were males (46.6%). The majority of the cases had abdominal pain and/or vomiting, 82% of patients had elevated serum lipase, and almost all patients had elevated serum lipase and/or amylase. Moreover, 72% of patients had abdominal CT findings suggestive of pancreatitis. All patients were discharged alive, except two patients were still in the intensive care unit (ICU), and only one patient died (Table 3).

Acute pancreatitis appears to be an infrequent complication/association of COVID-19. One retrospective study from the USA analyzing 11,883 patients with COVID-19 found that the point prevalence of pancreatitis was 0.27% (32 patients) [11]. However, another prospective international study of acute pancreatitis during the COVID-19 pandemic concluded that acute pancreatitis with SARS-CoV-2 infection has a higher risk of severity and poor clinical outcomes, including the risk of organ dysfunction higher 30-day inpatient mortality compared with acute pancreatitis patients who are SARS-CoV-2-negative [12].

### Table 3 Summary of the previous case reports important statistics

| Percentage of patients (%) |
|-----------------------------|
| Abdominal pain               | 89                |
| Vomiting                     | 45                |
| Elevated serum lipase        | 82                |
| Elevated serum amylase       | 69                |
| Elevated serum lipase and/or amylase | 100 |
| CT evidence of pancreatitis  | 72                |
| Discharged alive             | 86                |

### Conclusion

Until solid evidence on the relation between pancreatitis and SARS-CoV-2 is provided, we believe acute pancreatitis should be considered a potential explanation for acute abdominal pain in SARS-CoV-2 patients. Such evidence should rise from well-designed epidemiological studies as well as autopsy studies.

### Abbreviations

SARS-COV-2: Severe acute respiratory syndrome coronavirus 2; RT-PCR: Reverse-transcription polymerase chain reaction; NPO: Nil per os.

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### Authors’ contributions

Conceptualization: ASE, ARF. Data curation: ASE, ARF, SMM. Investigation: ASE, ARF, SMM, ME. Writing, original draft: ASE, ARF, SMM, ME. Writing, review and editing: ASE, ARF, SMM, ME. All authors have read and approved the manuscript.

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### Availability of data and materials

All data and reports are present upon request.

### Declarations

**Ethics approval and consent to participate**

Not applicable.

**Consent for publication**

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

**Competing interest**

The authors declare that they have no competing interests and no relationship with the industry.

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