

Severe acute pancreatitis as a complication of COVID-19; a case report

Natan Muluberhan¹, Semir Abdi², Amanuel Alemayehu¹, Melaku Getachew^{1*}

1. Department of Emergency and Critical Care Medicine, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia.

2. Department of Internal Medicine, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia.

*Corresponding Author: Melaku Getachew; Email: melakug02@gmail.com

Published online: 2021-11-07

Abstract: COVID-19 is a multisystemic infectious disease that primarily affects the respiratory system. However, the involvement of extra-pulmonary systems has also been reported. We report a 25-year-old female patient who visited the emergency department with a four-day history of severe burning epigastric pain associated with vomiting. The patient was later diagnosed with severe acute pancreatitis with concomitant severe COVID-19 based on clinical, biochemical, and imaging findings. The patient was managed with antibiotics, anticoagulation, and ventilatory support. Despite aggressive treatment efforts, the patient sustained cardiac arrest in the setting of refractory hypoxemia and passed away on day three of her hospitalization.

Keywords: Case Reports; COVID-19; Pancreatitis; SARS-CoV-2

Cite this article as: Muluberhan N, Abdi S, Alemayehu A, Getachew M. Severe acute pancreatitis as a complication of COVID-19; a case report. *Front Emerg Med.* 2022;6(2):e25.

1. Introduction

COVID-19 is a multisystemic infectious disease, primarily affecting the respiratory system (1). It was first reported in patients presenting with symptoms of atypical pneumonia with an unknown etiologic agent in Wuhan, China, in December 2019 (2). A study done in Zhongnan Hospital of Wuhan University showed that 17% of patients with COVID-19 were having concomitant pancreatic damages (3). Until now, the gastrointestinal and hepatobiliary systems are common known sites of extrapulmonary manifestations of COVID-19; yet, the manifestation of acute pancreatitis in COVID-19 has not yet been clearly studied. Here we present a case of acute pancreatitis likely caused by COVID-19 infection. For presenting this case, written informed consent was obtained from the patient's guardian.

2. Case presentation

A 25-year-old female patient presented to the emergency department (ED) of Hiwot Fana Comprehensive Specialized Hospital with a four-day history of severe burning epigastric pain radiating to the back, which was relieved by leaning forward and vomiting. The patient also experienced shortness of breath and dry cough. She had never been diagnosed with any chronic disease before and denied any previous history of alcoholism, smoking, substance abuse, or trauma. The patient had no recent surgery. An initial evaluation in the ED revealed a normal temperature (36.9°C), hypotension (blood pressure of 80/59 mmHg), tachycardia (heart rate of 106 beats per minute), tachypnea (a respiratory rate of 28

breaths per minute), and normal oxygen saturation of 98% in room air. The respiratory exam was remarkable for bilateral basal rales and dullness over the posterior lower half of the left lung field. Abdominal examination revealed epigastric tenderness.

Abdominal ultrasound revealed a diffuse enlarged edematous pancreas and peripancreatic fluid collection, normal-sized liver, and biliary ducts with no evidence of gallstones. Computed tomography (CT) scan was not done for the patient due to lack of access. Chest x-ray was performed, which showed multifocal infiltrates involving the left lower lobe with left pleural effusion (figure 1). Point of care ultrasound (POCUS) revealed significant bilateral B-lines. A thoracentesis was performed showing hemorrhagic fluid. Laboratory testing reported elevated amylase (675 u/l), while aspartate aminotransferase (AST) and alanine transaminase (ALT) levels were unremarkable (Table 1). Later, a nasal swab for SARS-CoV-2 reverse transcriptase-polymerase chain reaction (RT-PCR) tested positive.

On admission to the ED, the patient was resuscitated with intravenous (IV) crystalloids and treated symptomatically with bowel rest, IV morphine, omeprazole, and metoclopramide. She presented symptoms of acute hypoxic respiratory failure on the day of admission, necessitating high-flow oxygen supplementation. She was then transferred to an isolation center with a diagnosis of severe acute pancreatitis and acute respiratory distress syndrome (ARDS). At the isolation center, supportive treatment was continued and the patient was started on dexamethasone, therapeutic dose of unfractionated heparin, empiric IV vancomycin, and cefepime for the possibility

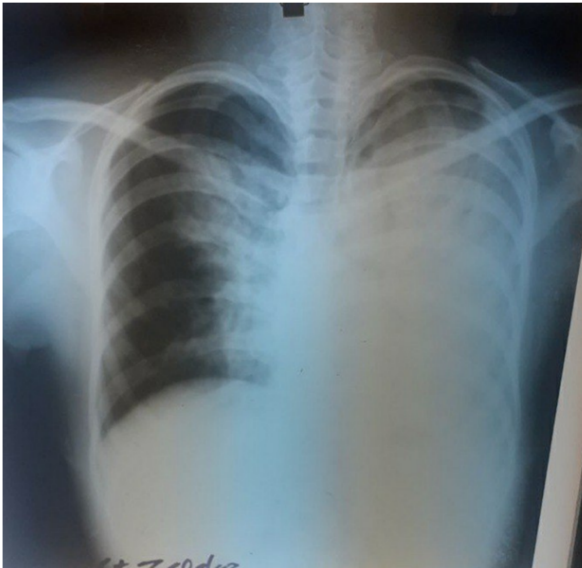


Figure 1 Chest x-ray of the patient showing multifocal infiltrates involving the left lower lobe along with left pleural effusion

of bacterial pneumonia, and was put on continuous positive airway pressure (CPAP) support.

On the second day of admission, her clinical condition worsened with further drop in her oxygen saturation and worsening of multiple B-lines on POCUS, due to which intubation and mechanical ventilation utilizing the Lung Protective Ventilation Strategy was begun (4). However, significant hypoxia persisted and neuromuscular blockade with vecuronium infusion was started as cisatracurium was not readily available at the hospital. Proning and recruitment maneuver was also carried out. Despite aggressive treatment efforts, the patient sustained cardiac arrest in the setting of refractory hypoxemia and passed away on day three of her hospitalization.

3. Discussion

COVID-19 is a multisystem infectious disease that commonly affects the respiratory system but has also been associated with gastrointestinal problems in recent studies. In fact, recent studies show that approximately half of the COVID-19 patients have a history of gastrointestinal symptoms such as loss of appetite, nausea, abdominal pain, vomiting, and diarrhea. However, involvement of the pancreas is rare (5-8).

In our patient, COVID-19 presented as a case of severe acute pancreatitis with subsequent ARDS. The diagnosis of acute pancreatitis concurrent with COVID-19 was made based on a combination of clinical features, laboratory findings, and abdominal imaging. Based on the history, clinical examination, and laboratory findings, the common etiologies of acute pancreatitis, such as gallstones, alcohol, trauma and etc., were ruled out.

The mechanism of SARS-CoV-2 entry is not completely clear at this point as Angiotensin-converting enzyme 2 (ACE2) is only expressed in beta-cells in a subset of patients. There-

fore, other receptors/factors may be involved in facilitating the uptake of SARS-CoV-2 into beta-cells; direct cytotoxic effects of SARS-CoV-2 or an immune-mediated and indirect systemic inflammatory response is a proposed mechanism for islet cell damage, which leads to acute pancreatitis (9-11). Several studies have reported an association between COVID-19 and acute pancreatitis, but there is no consensus on causality. Gonzalo-Voltas et al. described a case of acute pancreatitis in a COVID-19 positive patient in the absence of the most common risk factors: alcohol and gallstones (11). Additionally, a case report was published on three family members admitted with COVID-19 to the critical care unit in March 2020, showing that two patients had severe acute pancreatitis (12). A retrospective cohort study was conducted in the USA to examine the cause of acute pancreatitis concurrent with COVID-19. The result of this study was consistent with a previous study, in which the rate of acute pancreatitis with unknown cause was higher in patients with COVID-19 (13). Similarly, a prospective cohort study done in a multicenter setting showed patients with SARS-CoV-2 infection were having a higher incidence of acute pancreatitis with ruling out of other causes of pancreatitis (14). COVID-19 patients with acute pancreatitis had a higher risk of severe illness, prolonged hospitalization, end-organ failure, and a higher 30-day mortality rate (15). In contrast to these reports, there are other studies that deny an association between COVID-19 and acute pancreatitis. A prospective cohort study on 433 COVID-19 patients admitted to two Dutch university hospitals found that the incidence of acute pancreatitis as a complication of COVID-19 was low (1.2%) (16) and had no impact on the patients' outcome (13, 16, 17).

Although the data on the exact mechanism of action of this novel virus is still scarce, this case report demonstrates concurrency between COVID-19 and acute pancreatitis in the absence of common and well-established precipitants of the disease, suggesting a case of SARS-CoV-2-induced pancreatic injury. It is worth mentioning that the majority of reported cases, like ours, were identified in moderate to severe disease states. Nonetheless, our findings highlight the need to investigate COVID-19 patients with gastrointestinal symptoms for pancreatitis and treat them accordingly.

4. Conclusion

Investigations (clinical, laboratory, and imaging) were performed on our patient to identify the cause of acute pancreatitis, and the common causes were ruled out. Despite the fact that the causality cannot be confirmed based on this single case report, we believe that COVID-19-induced acute pancreatitis should still be considered.

5. Declarations

5.1. Acknowledgment

None.

Table 1 Laboratory evaluations of the patient on admission to the emergency department

Parameter	Result	Normal range
White blood cell (/per microliter)	3.55×10^3	3.71×10^3 - 10.67×10^3
Hematocrit (%)	40.4	35.1-48.7
Platelet count (/per microliter)	259.7×10^3	150.5×10^3 - 366.8×10^3
Alanine aminotransferase (U/liter)	140	12-38
Aspartate aminotransferase (U/liter)	153	7-41
Creatinine (mg/dl)	0.8	0.5-1.2
Blood glucose (mg/dL)	99	75-100
Amylase (IU/L)	675.1	0.00-86.00
Triglyceride (mg/dl)	80	0-150
Erythrocyte sedimentation rate (mm/hr)	58	0-20
Electrolyte		
Sodium (mEq/L)	138.7	136-146
Potassium (mEq/L)	3.23	3.5-5.0
Chlorine (mEq/L)	116.6	102-109
Coagulation profiles		
Prothrombin time (seconds)	16.3	10-14
Partial thromboplastin time (seconds)	20.7	26.8-36.8
International normalized ratio	1.80	<1.1

5.2. Authors' contribution

All the authors fulfill the criteria of authorship based on the recommendations of the international Committee of Medical Journal Editors (ICMJE).

5.3. Conflict of interest

The authors declare no conflict of interest.

5.4. Funding

None declared.

References

- El-Zoghby SM, Soltan EM, Salama HM. Impact of the COVID-19 pandemic on mental health and social support among adult Egyptians. *J Community Health*. 2020;45:689-95.
- Rodríguez BO, Sánchez TL. The Psychosocial Impact of COVID-19 on health care workers. *International braz j urol*. 2020;46:195-200.
- Wang F, Wang H, Fan J, Zhang Y, Wang H, Zhao Q. Pancreatic injury patterns in patients with coronavirus disease 19 pneumonia. *Gastroenterology*. 2020;159(1):367-70.
- Jabbari A, Alijanpour E, Maleh PA, Heidari B. Lung protection strategy as an effective treatment in acute respiratory distress syndrome. *Caspian J Intern Med*. 2013;4(1):560-3.
- Weston S, Frieman MB. COVID-19: knowns, unknowns, and questions. *mSphere*. 2020;5(2):e00203-20.
- Aloysius MM, Thatti A, Gupta A, Sharma N, Bansal P, Goyal H. COVID-19 presenting as acute pancreatitis. *Pancreatol*. 2020;20(5):1026-7.
- Kataria S, Sharif A, Rehman AU, Ahmed Z, Hanan A. COVID-19 induced acute pancreatitis: a case report and literature review. *Cureus*. 2020;12(7):e9169.
- Mazrouei SSA, Saeed GA, Al Helali AA. COVID-19- associated acute pancreatitis: a rare cause of acute abdomen. *Radiol Case Rep*. 2020;15(9):1601-3.
- Liu F, Long X, Zhang B, Zhang W, Chen X, Zhang Z. ACE2 expression in pancreas may cause pancreatic damage after SARS-CoV-2 infection. *Clin Gastroenterol Hepatol*. 2020;18(9):2128-30.e2.
- Gonzalo- Voltas A, Fernández- Pérez- Torres CU, Baena-Díez JM. Acute pancreatitis in a patient with COVID-19 infection. *Med Clin*. 2020;155(4):183-4.
- Steenblock C, Richter S, Berger I, Barovic M, Schmid J, Schubert U, et al. Viral infiltration of pancreatic islets in patients with COVID-19. *Nat Commun*. 2021;12(1):3534.
- Hadi A, Werge M, Kristiansen KT, Pedersen UG, Karstensen JG, Novovic S, et al. Coronavirus disease-19 (COVID-19) associated with severe acute pancreatitis: case report on three family members. *Pancreatol*. 2020;20(4):665-7.
- de-Madaria E, Capurso G. COVID-19 and acute pancreatitis: examining the causality. *Nat Rev Gastroenterol Hepatol*. 2021;18(1):3-4.
- Patel KP, Patel PA, Vunnam RR, Hewlett AT, Jain R, Jing R, et al. Gastrointestinal, hepatobiliary, and pancreatic manifestations of COVID-19. *J Clin Virol*.

- 2020;128:104386.
15. Pandanaboyana S, Moir J, Leeds JS, Oppong K, Kanwar A, Marzouk A, et al. SARS-CoV-2 infection in acute pancreatitis increases disease severity and 30-day mortality: COVID PAN collaborative study. *Gut*. 2021;70(6):1061-9.
 16. Bulthuis MC, Boxhoorn L, Beudel M, Elbers PW, Kop MP, van Wanrooij RL, et al. Acute pancreatitis in COVID-19 patients: true risk? *Scand J Gastroenterol*. 2021;56(5):585-7.
 17. de Sá TC, Soares C, Rocha M. Acute pancreatitis and COVID-19: A literature review. *World J Gastrointest Surg*. 2021;13(6):574-84.