A comparative study between COVID-19 versus Non-COVID patients presented with acute pancreatitis in Baghdad Teaching Hospital

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***Abstract*- Background:** COVID-19 presented as pulmonary and extra pulmonary manifestations. Acute pancreatitis is an inflammatory disorder that affects the pancreas and sometimes adjacent tissues. Studies showed a possible effect of COVID-19 on pancreas as many patients infected with COVID-19 presented with Acute pancreatitis.**Aim of Study:** The aim of our study is to compare the effects of SARS-CoV-2 on Acute pancreatitis in covid and non-covid patients regarding presentation, severity, complications and prognosis of Acute pancreatitis.**Patients and Methods:** A prospective comparative case control study. It was performed in the surgical unit of Baghdad Teaching Hospital in Medical City from January 1, 2021 to December 31, 2021. The study included 80 patients diagnosed with Acute pancreatitis, 40 of them COVID-19 positive, compared with the other 40 patients who were covid negative to assess the effect of the virus on presentation, severity, complications and prognosis of Acute pancreatitis.**Results:**The results revealed statistical significant effect between severity of both Acute pancreatitis and COVID-19 where, 87.5% of critical COVID-19 developed severe Acute pancreatitis while, 85.7% who were mild COVID-19 showed mild Acute pancreatitis. This study showed increase in respiratory symptoms (dyspnea and decrease SPO2%) in case group (COVID-19 positive) patients. The prevalent etiology in both groups (case and control) was biliary followed by alcoholic and idiopathic. Certain laboratory tests increased in case group. Our results revealed increase in systemic complications (Pleural effusion and Respiratory failure) in case group. Also, results showed increase in the use of anticoagulant agents in treatment of case group compared to control group. Hospital stay was longer in case group without statistical significance. **Conclusion:**The severity of COVID-19 and acute pancreatitis among the case group are found to be correlated. SARS-CoV-2 may cause direct or indirect harm to start acute pancreatitis in cases where the cause of AP is idiopathic. It was more common for the case group to experience respiratory problems such respiratory failure and pleural effusion. Some of laboratory tests in the case group had significantly higher results. Recovery was higher in the control group (97%) while death was higher in the case group (25%) without statistical significance.

***Index Terms*-** COVID-19 ; Acute pancreatitis; Baghdad Teaching Hospital

I. INTRODUCTION

Nearly 50% of adults have experienced abdominal pain, and 5–10% of all emergency visits are related to it [1.]. Acute abdominal pain is defined as the development of abdominal pain suddenly and lasting shorter than 24 hours. [2]. Acute pancreatitis (AP) is an acute inflammation of the pancreas that can vary in its involvement of nearby organs and/or peripancreatic tissues [3]. Acute pancreatitis is mild and recovers on its own without major consequences in 80% of cases with 20% complicated [4]. Acinar cells abnormally activate pancreatic enzymes, which results in acute pancreatitis. Auto-digestion of typical pancreatic parenchyma is brought on by intra-acinar pancreatic enzyme activation. [5]. Gallstones [6], alcoholism, endoscopic retrograde [7], hypercalcemia [8], genetic reasons [9], hypertriglyceridemia, drug-induced pancreatitis [10] [11], and infections [12] are some of the causes of acute pancreatitis. In December 2019, Wuhan, China, reported the emergence of the SARS-CoV-2 coronavirus, which quickly spread across China and other nations [13]. The coronavirus illness 2019 (COVID-19, formerly known as novel coronavirus pneumonia [NCP]) caused by SARS-CoV-2 has caused a total of 634 835 cases worldwide as of March 29, 2020, of which 29 957 victims have died [14].

Middle East respiratory syndrome (MERS)-CoV (858 deaths globally) and SARS-CoV (774 deaths worldwide) were the two coronaviruses that caused the most deaths ever [15]. According to Pan et al [16], 103 (50.5%) of 204 COVID-19 patients were hospitalized due to gastrointestinal symptoms, including nausea (3.9%), vomiting (3.9%), diarrhea (34%), and abdominal discomfort (1.9%). It is clear that some patients initially experience gastrointestinal and stomach symptoms before developing fever and dyspnea when COVID-19 first manifests.Although coronavirus disease 2019 (COVID-19) is typically thought of as the illness that can cause dysfunction in many organs, including the pancreas, heart, liver, gut, and kidneys.

According to certain reports [17; 18], there are some associations between COVID-19 and acute pancreatitis. Pancreatic injury may therefore be linked to COVID-19 consequences, just like SARS-CoV infection [19].

Patients and methods:

Study design and setting: In the Surgery Department of the Baghdad Teaching Hospital in Medical City, a comparative case control research was carried out. The primary objectives of this study were to investigate the linked Covid-19 patients with acute pancreatitis and to pinpoint the major risk factors.The investigation was conducted from January 1 to December 30, 2021.

Study population: Patients with acute pancreatitis who visited the emergency room in the medical city were the study's target population. And who (male and female) agreed to take part in the study.

Inclusion Criteria: Study participants who are willing to participate; Patients having pancreatitis that is acute and Patients who are at least 18 years old.so the **Exclusion Criteria:**Patients arrived with traumatic-related acute pancreatitis; Children and pregnant women frequently appeared with an acute abdomen; Malignancy diagnosis; Patients declined to participate in the trial ; Previously COVID-19-infected;People who are immunocompromised or take immunosuppressive medications; Propensity for bleeding and use of anticoagulants and Post ERCP.

Sampling Design:

Sample size: Eighty individuals with acute pancreatitis who visited the emergency room of Medical City in Baghdad were included in our convenience sample. They were divided into two equal groups, each with 40 patients.

- **Case group:** Patients over the age of 18 who have COVID-19 at any stage and an acute pancreatitis clinical diagnosis were included. A polymerase chain reaction (PCRc19) test to identify SARS-CoV-2 in a nasopharyngeal swab sample and serological methods to identify blood antibodies were used to determine the microbiological diagnosis of COVID-19.
- **Control group:** Patients older than 18 who were hospitalized to our medical facility with a clinical diagnosis of acute pancreatitis but without (COVID-19 as PCR negative) were included.
- **Sample methods:** A detailed history, physical examination, laboratory tests, and/or imaging scans are all part of the evaluation of acute pancreatitis..

Definitions of Severity of AP with Criteria of Diagnosis: According to Ranson criteria, the severity of AP was determined [20]. While the Revised Atlanta Criteria were used for the acute pancreatitis diagnostic criteria [21].

Classification of COVID-19 severity: Patients were categorized based on the NIH standards for COVI-19 severity.

Data collection:: The participants' answers to a structured questionnaire were used to compile the data. The researcher was responsible for subtending.

Data Collection Tool:Questionnaire: The questionnaire was reviewed by the supervisor and consists of;

Information on the disease, such as the patient's complaints, the duration of the pain, the intensity of the pain (0–10 scale), any accompanying symptoms, the severity of acute pancreatitis, and any complications. COVID-19 history: first infection and the symptoms. Prognosis of disease, hospital stay and treatment.

Laboratory tests:D-dimer, LDH, G. level, CRP, B. Urea, S. amylase and lipase levels .

Imaging studies: Ultrasonography and CT scan.

Statistical Analysis: The study used a computerized database structure to store the data and conducted statistical analysis using the SPSS program for Windows 20 version 20. The significance of the relationship between categorical variables and P was determined using Chi-square. The results were reported as frequency and percentage, and the statistical analysis showed that the value was significant at 0.05.

II.Results

Results show that there was no statistical significance between the case and control groups regarding the severity of abdominal pain (p=0.225) (Table 1).

Table 1: Distribution of study sample groups according to abdominal pain characteristics

Variable		Case	Control	Total	P value
Abdominal pain severity	Mild	5	1	6	0.225
		12.50 %	2.50%	7.50%	
	Moderate	12	12	24	
		30.00 %	30.00 %	30.00 %	
	Severe	23	27	50	
		57.50 %	67.50 %	62.50 %	
	Total	40	40	80	
		100.00 %	100.00 %	100.00 %	
Variable		Case	Control	Total	P value
Duration of pain	Mean	7.65	7.10	40	0.406
	S.D	3.11	2.76	40	

With regard to the accompanying symptoms, In case group, there was statistical significance in patients with dyspnea and a drop in O2 level (**0.035**) and (**0.001**) respectively (Table 2).

Table 2: Distribution of study sample groups according to associated symptoms.

	Case	**Control**	**Total**	**P value**
Dyspnea	23	14	37	**0.035***
	57.50%	35.00%	46.30%	
Total	40	40	80	
	100.00%	100.00%	100.00%	
	Case	**Control**	**Total**	**P value**
Decrease SPO2%	19	3	22	**0.001***
	47.50%	7.50%	27.50%	
Total	40	40	80	
	100.00%	100.00%	100.00%	

The most frequent etiologies of acute pancreatitis in both groups, biliary (51.2%), alcoholic 23.8%, unknown causes, and hyperlipidemia (20% and 5%), respectively without any statistically significant correlation (p=0.733) (Table 3).

Table 3: Distribution of study sample groups according to etiology.

Etiology	Case	Control	Total	P value
Biliary	21	20	41	0.733
	52.50%	50.00%	51.20%	
Alcoholic	9	10	19	

	22.50%	25.00%	23.80%	
Unknown	9	7	16	
	22.50%	17.50%	20.00%	
Hyperlipidemia	1	3	4	
	2.50%	7.50%	5.00%	
Total	40	40	80	
	100.00%	100.00%	100.00%	

Table 4, shows no statistical significant association in image findings (p>0.05) except Ground glass opacification showed 20% among case group and 0% among control group with statistical difference (p=0.003).

Table 4: Distribution of study sample groups according to imaging findings.

Enlarged pancreas	Case	Control	Total	P value
	29 (72.5%)	23(57.5 %)	52(65%)	0.160
Total	40(100 %)	40(100 %)	80(100 %)	
Peripancreatic fluid collection	Case	Control	Total	P value
	5(12.5%)	6(15%)	11(13.8 %)	0.735
Total	40(100 %)	40(100 %)	80(100 %)	
Mesenteric fat stranding	Case	Control	Total	P value
	12(30%)	10(25%)	22(27%)	0.617
Total	40(100 %)	40(100 %)	80(100 %)	
Dilated pancreatic duct	Case	Control	Total	P value
	4(10%)	2(5%)	6(7.5%)	0.396
Total	40(100 %)	40(100 %)	80(100 %)	
Pleural effusion	Case	Control	Total	P value
	9 (22.5%)	4(10%)	13(16.3 %)	0.130
Total	40(100 %)	40(100 %)	80(100 %)	
Gall stone	Case	Control	Total	P value
	19(47.5 %)	23(57.5 %)	42(52.5 %)	0.370
Total	40(100 %)	40(100 %)	80(100 %)	
CBD stone	Case	Control	Total	P value
	4(10%)	3(7.5%)	7(8.8%)	0.692
Total	40(100 %)	40(100 %)	80(100 %)	
Ground glass opacification	Case	Control	Total	P value
	8(20%)	0(0%)	8(10%)	0.003*
Total	40(100 %)	40(100 %)	80(100 %)	

Fluid collection in the pelvis was more common in the control group; meanwhile, patients with pancreatic necrosis were only found in the case group (p=0.305) and (p=0.314) respectively were both lacked statistical significance. Pleural effusion and respiratory failure were higher and statistically significant in case group (p=0.006) and (p=0.025%) respectively (Table 5).

Table 5: Distribution of study sample groups according to complications.

Fluid collection in pelvis	Case	Control	Total	P value
	1	3	4	0.305
	2.50%	7.50%	5.00%	
Total	40	40	80	
	100.00 %	100.00 %	100.00 %	
Pancreatic necrosis	Case	Control	Total	P value
	1	0	1	0.314
	2.50%	0.00%	1.30%	
Total	40	40	80	
	100.00 %	100.00 %	100.00 %	
Pleural effusion	Case	Control	Total	P value
	21	9	30	0.006*
	52.50%	22.50%	37.50%	
Total	40	40	80	
	100.00 %	100.00 %	100.00 %	
ARDS	Case	Control	Total	P value
	10	4	14	0.077
	25.00%	10.00%	17.50%	
Total	40	40	80	
	100.00 %	100.00 %	100.00 %	
Respiratory failure	Case	Control	Total	P value
	7	1	8	0.025*
	17.50%	2.50%	10.00%	
Total	40	40	80	
	100.00 %	100.00 %	100.00 %	
Renal failure	Case	Control	Total	p value
	4	1	5	0.166
	10.00%	2.50%	6.30%	
Total	40	40	80	
	100.00 %	100.00 %	100.00 %	

D-dimer, S. amylase, and lipase were higher in the case group with no statistical significance (p>0.05); LDH, G. level, CRP and B. urea were significantly higher in the case group with a statistical significance (p0.05) (Table 6).

Table 6: Distribution of study sample groups according to laboratory tests.

Variables	Groups	No.	M.±S.D	P value
D-dimer	Case	40	1340.55±965.286	0.325
	Control	40	1066.2±1461.907	
LDH	Case	40	481.88±174.038	0.001*
	Control	40	265.73±115.69	
G. level	Case	40	178.088±128.5915	0.012*
	Control	40	120.025±68.0073	
CRP	Case	40	136.688±112.1281	0.001*
	Control	40	69.083±48.1152	
B. Urea	Case	39	102.56±80.966	0.001*
	Control	40	53.05±37.681	
Amylase	Case	40	759.18±685.078	0.354
	Control	40	632.25±534.233	
Lipase	Case	40	807.73±1045.88	0.058
	Control	40	470.75±368.775	

Table 7 shows that patients in case group require more oxygen support with no statistical significance (p=0.178), whereas those who required anticoagulant agents (67.5%) of the case group and 35% of the control group, with a statistical significance (p=0.004).

Table 7: Distribution of study sample groups according to treatment characteristic.

O2	Case	Control	Total	P value
	21	15	36	0.178
	52.50%	37.50%	45.00%	
Total	40	40	80	
	100.00%	100.00%	100.00%	
Anticoagulant agents	Case	Control	Total	P value
	27	14	41	0.004*
	67.50%	35.00%	51.20%	
Total	40	40	80	
	100.00%	100.00%	100.00%	

Regarding outcome factors, the length of hospital stay, number of patients admitted to the intensive care unit and death were higher in case group without statistical significance (Table 8).

Table 8: Distribution of study sample groups according to outcome factors.

Hospital stay	Case	Control	Total	P value
Mean	7.68	4.54	40	0.451
SD.	7.1	3.22	40	
ICU	Case	Control	Total	P value
	14	7	21	0.859
	35.00%	17.50%	26.30%	
Total	40	40	80	
	100.00%	100.00%	100.00%	
Prognosis	Case	Control	Total	P value
Recovery	30	39	69	0.633
	75.00%	97.50%	86.30%	
Death	10	1	11	
	25.00%	2.50%	13.80%	
Total	40	40	80	
	100.00%	100.00%	100.00%	

According to Table 9's findings, there is a statistically significant correlation between acute pancreatitis severity and COVID-19 severity (p=0.001).

Table 9: Association between severity COVID- 19 and acute pancreatitis.

	Severity of acute pancreatitis				
Covid-19 severity	Mild	Moderate	Severe	Total	P value
Mild	12	2	0	14	**0.001***
	85.70%	14.30%	0.00%	100.00%	
Moderate	2	6	0	8	
	25.00%	75.00%	0.00%	100.00%	
Severe	1	6	3	10	
	10.00%	60.00%	30.00%	100.00%	
Critical	0	1	7	8	
	0.00%	12.50%	87.50%	100.00%	
Total	15	15	10	40	
	37.50%	37.50%	25.00%	100.00%	

Discussion:

The study found that the severity and duration of abdominal pain did not differ significantly between the two groups, suggesting that COVID-19 does not aggravate the severity of abdominal pain in AP. which is in line with other studies [22].

Patients in the case group presented with respiratory symptoms (57% dyspnea and 47.5% decrease in SPO2%) which are in line with that of [23]. Biliary (51.2%) was the most

prevalent etiology among both groups, followed by alcoholic (23.8 %) and unknown causes and hypertriglyceridemia (20% and 5%) respectively. These results are in line with those of [24] and [25].

This study found that the most common radiological finding in both the case and control groups was an increase in pancreatic size (65%), with no statistical significance between the two groups. This is in line with [26]. This result can be explained as both of AP and COVID-19 are induce inflammatory response in pancreatic tissue with subsequent increase in size. Ground glass opacification was 20% in case group and 0% among control group with statistical difference (p=0.003). these results are in line with [27].

Complications such as pleural effusion, respiratory failure, ARDS, pancreatic necrosis, and renal failure were higher in the case group with statistical significance only for pleural effusion and respiratory failure which is in line with [18]. In the current study, we found D-dimer, S. amylase and lipase were more in case group than control group but without statistical significant association (p>0.05), while LDH, G. level, CRP and B. urea were highly more in case group with statistical significant association (p<0.05) which is in line with [28].

Anticoagulant usage was higher in the case group and statistically significant. Our results highlight the need of using anticoagulants in order to lowering the comorbidity and mortality. Concerning the outcome, our results found duration of hospital stay was longer in case group without statistical significance (p=0.451), which are in line with [29]. The study also found a significant association between the severity of acute pancreatitis and COVID-19 severity,which are in line with [30].

III.CONCLUSION

III.Conclusion: The severity of COVID-19 and acute pancreatitis among the case group are found to be correlated. SARS-CoV-2 may cause direct or indirect harm to start acute pancreatitis in cases where the cause of AP is idiopathic. It was more common for the case group to experience respiratory problems such respiratory failure and pleural effusion. Some of laboratory tests in the case group had significantly higher results. Recovery was higher in the control group (97%) while death was higher in the case group (25%) without statistical significance.

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