ORIGINAL ARTICLE

What has changed? The impact of the COVID-19 pandemic on the management of acute biliary pancreatitis

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ABSTRACT

BACKGROUND: The COVID-19 pandemic thoroughly changed the daily practices of medicine. We retrospectively evaluated the impact of the COVID-19 pandemic on our management strategies for patients with acute biliary pancreatitis (ABP).

METHODS: A total of 91 patients with ABP who were treated at Trakya University Faculty of Medicine between March 15, 2019 and March 15, 2021 were retrospectively recruited. Patients were classified as pre-COVID and COVID-era patients. The comorbidity markers, data from laboratory tests, inflammatory markers, and radiological examinations were evaluated. Length of stay, need for an intensive care unit, morbidity, mortality, recurrent ABP, and definitive treatment rates were evaluated, and the data of the two periods were compared.

RESULTS: Two groups of patients, 57 in the pre-COVID period and 34 in the COVID period, were included in the study. We found that ABP admissions decreased significantly during periods of increased national COVID-19 diagnoses. Type 2 diabetes mellitus was significantly higher in the COVID period patients (P=0.044), and COVID patients had significantly higher total (P=0.004), direct bilirubin (P=0.007), and lipases (P<0.001). The cholecystectomy rate after an attack decreased from 26% in the pre-COVID period to 15.6% during COVID.

CONCLUSION: COVID strikingly reduced the admissions of ABP patients in the early stages of the disease to hospitals, leading to inevitable admissions in advanced severity. Moreover, a significant increase was detected in the recurrence rates of ABP. This can be explained by the reduction in cholecystectomy performed.

Keywords: Acute biliary pancreatitis; cholecystectomy; COVID era; COVID-19; systemic inflammatory response index.

INTRODUCTION

After the severe acute respiratory syndrome coronavirus 2 infection was recognized as a pandemic by the World Health Organization on March 11, 2020, many professional organizations recommended that elective surgeries be canceled so that hospital beds and other resources could be used for COVID-19 patients. This was also an important decision to protect healthcare workers.[1]

Westgard et al. reported that 28 days after the state declared the COVID-19 pandemic, there was a sharp overall decline of 49.3% in emergency department (ED) visits compared to 28 days before the declaration, which also contributed to a 35.2% decline when compared with the same time in 2019.[2] Similarly, Nourazari et al. stated that in a given time interval (between weeks 11 and 36 of 2020), overall hospital admissions through the ED were reduced by 32% compared to 2019. The number of patients diagnosed with pancreatic disorders (PD) at admission to the ED was 460 in 2019; in 2020, 351 patients were diagnosed, making a 24% decrease in patients with PD.[3]

The diagnostic criteria for acute pancreatitis (AP) are abdominal pain, elevated serum lipase and amylase values over 3 times

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the normal ranges, and pathognomonic radiological findings related to pancreatic inflammation. Although the first two criteria are sufficient for diagnosing AP, radiological imaging is important in defining the etiology.[4] Cholelithiasis is the most common cause, with a rate of up to 55% in the etiology of AP, and alcohol is the second most important factor. Many factors, from hypertriglyceridemia to some viral infections, may cause AP.[4,5] Du et al. detected that, although it was not statistically significant in the etiology of AP, while the biliary etiology increased during the COVID period, some other factors showed a decrease.[6] Acute biliary pancreatitis (ABP) is an inflammatory process with a clinical course ranging from mild interstitial edema to pancreatic necrosis. The inflammatory response that develops during ABP can lead to systemic inflammatory response syndrome (SIRS). Excessive SIRS leads to multiple organ dysfunction syndrome, which poses a high risk of morbidity and mortality.[7] As the early diagnosis of biliary pancreatitis affects the clinical course and treatment management, definitive treatment for recurrent disease is also paramount.[4,8]

In this study, we aimed to investigate the effects of the COVID-19 pandemic on the course and management of ABP.

MATERIALS AND METHODS

In this single-site retrospective cohort study, the hospital records of all consecutive adult patients hospitalized with an ABP diagnosis in the general surgery and intensive care units (ICU) of Trakya University Medical Faculty Hospital were reviewed. The pre-COVID-19 era represents the time between March 15, 2019 and March 15, 2020, and the COVID-19 era defines March 15, 2020–March 15, 2021. Patients under 18 years of age, pregnant patients with AP, and patients with non-biliary AP were excluded from the study. Besides, patients with chronic pancreatitis and pancreatic malignancies were not included in it. Two patients who died in the first 2 days of the COVID period were excluded from the study.
Patients were classified as having mild or severe AP according to the Ranson classification. The comorbidity markers, data from laboratory tests for diagnosis and follow-up, and radiological examinations were evaluated. Length of stay, need for ICU, morbidity, mortality, recurrent ABP, and definitive treatment rates were evaluated, and the data of the two periods were compared. Neutrophil/lymphocyte ratio (NLR), platelet/lymphocyte ratio (PLR), lymphocyte/monocyte ratio (LMR), prognostic nutritional index (PNI), and systemic inflammatory response index (SIRI) values, which are inflammatory markers, were determined. The SIRI was calculated as follows: SIRI = (neutrophils × monocytes/lymphocytes). PNI was calculated using the formula 10× serum albumin (g/dL) + 0.005 total lymphocyte count (per mm3).

Statistical Analysis

Jamovi software version 1.2 was used to perform the statistical analysis. The normality of continuous variables was checked using the Shapiro–Wilk test, and they are stated as mean ± standard deviation if they are normally distributed and as median (interquartile range) if not. Furthermore, categorical variables were compared using the Chi-square test, and skewed datasets were compared using the Mann–Whitney U test. A $P<0.05$ was regarded as statistically significant for all tests.

The Ministry of Health first approved this study, and then permission was obtained from the local ethics committee.

RESULTS

Ninety-one patients were included in the study. Fifty-seven patients were hospitalized during the pre-COVID period, and 34 were hospitalized during the COVID pandemic. In the COVID period, only one patient's PCR test was positive. During the COVID period, two patients died in the ICU on the 1st and 2nd days of hospitalization. One of them had abdominal compartment syndrome at the time of admission. These two cases were excluded from the study.

In the COVID period, ABP cases admitted to the ER decreased significantly when the national number of COVID cases announced by the Ministry of Health increased. ABP cases increased when the national number of COVID patients decreased. The distribution of patient admissions by time for the pre-COVID period is given in Figure 1. During the COVID period, the monthly distribution of patient admissions to the ER and the monthly number of national COVID cases are given in Figures 2 and 3, respectively. (Figure 3 has been

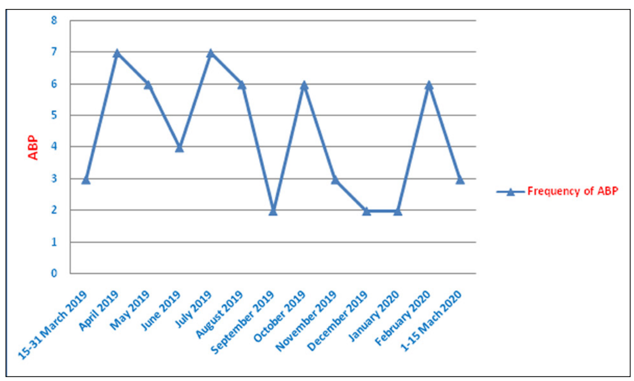

Figure 1. Distribution of ABP cases by months in the pre-COVID

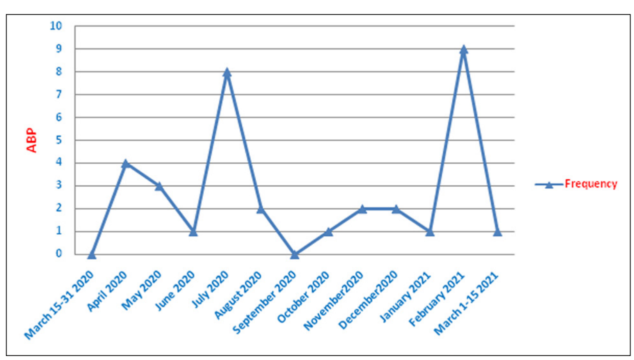

Figure 2. Distribution of ABP cases 11 by months in the COVID period

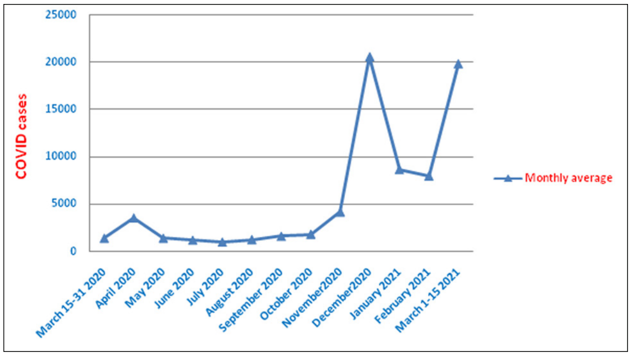

Figure 3. Distribution of monthly average COVID cases by months

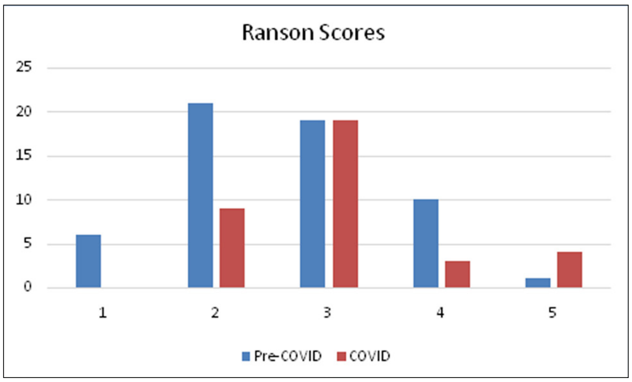

Figure 4. Ranson scores of cases in the Pre-COVID and COVID period

prepared in line with the daily case numbers announced by the Ministry of Health of the Republic of Türkiye).[9]

The mean age of the patients was 68.2±13.5 years in the pre-COVID period and 62.7±19.3 years in the COVID pandemic period. In the pre-COVID period, the average hospitalization day in the ICU was 0.08 day/patient, while it was 0.3 day/patient in the COVID period. This was found to be statistically significantly higher during the COVID period (P<0.05). The difference between the frequency of type 2 diabetes mellitus (DM) during the pre-COVID period and the COVID pandemic period was statistically significant (P=0.044), with 16 out of 57 (28%) and 17 out of 34 patients (50%), respectively. The demographic characteristics of the patients for both periods are given in Table 1.

When the two periods were compared, the mean total bilirubin values in the pre-COVID period were 2.42±2.43, while they were 3.42±02.04 during the COVID period. This was statistically significant (P=0.004). Likewise, direct bilirubin values in the COVID period were statistically significantly higher than in the pre-COVID period (P=0.007). Although there was no statistical difference between the two groups regarding the amylase values at the time of admission, the lipase values were statistically significantly higher in the COVID period (P=0.001). The other laboratory values of both groups did not reveal any statistically significant difference. When NLR, PLR, LMR, and SIRI were evaluated, there was no statistically

Table 1. Demographic data of the patients in pre-COVID and COVID periods

	Pre-Covid (n=57)		Covid (n=34)		
	Mean	**SD**	**Mean**	**SD**	**P-Value**
Age	68.2	13.5	62.7	19.3	0.681
	Total days of stay/patients		**Total days of stay/patients**		
Length of stay	6.14	3.31	5.32	2.33	0.330
Length of ICU stay	0.08	0.4	0.3	0.7	0.045
	n	**%**	**n**	**%**	
ICU need	2	3.5	5	14.7	0.060
Gender					0.287
Female	25		19		
Male	32		15		
Comorbidities					
T2DM	16	28	17	50	0.044
HBP	40	70	25	73.5	0.81
CVD	25	43.9	9	26.5	0.12
Previous Cholecystectomy	7	12.2	2	5.9	0.47
Previous ERCP	7	12.2	1	2.94	0.25

SD: Standard deviation; n: Number of patients; P: Statistical significance; ICU: Intensive care unit-the number of patients in each group that needed the support of ICU; T2DM: Type 2 diabetes mellitus; HBP: High blood pressure; CVD: Cardiovascular disease; ERCP: Endoscopic retrograde colangiopancreaticography.

Table 2. Laboratory findings of pre-COVID and COVID patients

Normal range		Pre-Covid (n=57)		Covid (n=34)		
		Mean	SD	Mean	SD	P-değeri
Fasting glucose	(74–106 mg/dL)	135	47.9	131	30.9	0.799
AST	(0–40 U/L)	181	176	234	196	0.071
LDH	(0–247 U/L)	452	185	478	211	0.703
WBC		12737	6700	12079	4200	0.873
Total Bilirubin	(0–1.2 mg/dL)	2.42	2.43	3.42	2.04	0.004 (*)
D.Bil	(0–0.2 mg/dL)	1.18	1.55	1.78	1.43	0.007 (*)
Amylase	(25–85 U/L)	1563	868	1754	725	0.180
Lipase	(0–160 U/L)	1285	683	5151	4065	<0.001(*)
Albumin	(3.5–5.2 g/dL)	3.53	0.71	3.93	0.44	0.017 (*)
CRP	(<5 mg/dL)	7.29	7.81	4.55	4.38	0.290
Hemoglobin	(11.9–14.6 g/dL)	12.8	1.97	13.2	1.87	0.327
Platelet	(150–370×103/µL)	242588	115355	249324	65119	0.509
WBC	(3.57–11×103/µL)	12702	6735	12079	4196	0.847
Neutrophil	(1.69–7.5×103/µL)	10635	6316	10050	3997	0.774
Monocyte	(0.28–0.86×103/µL)	839	577	684	355	0.222
Lymphocyte	(0.88–2.89×103/µL)	1246	800	1253	789	0.938
On the 3rd day						
CRP	(<5 mg/dL)	9.10	8.23	3.81	2.95	0.001 (*)
Platelet	(150–370×103/µL)	203228	93713	207088	63455	0.697
WBC	(3.57–11×103/µL)	9918	5271	9230	3820	0.977
Neutrophil	(1.69–7.5×103/µL)	7368	5080	6903	3335	0.841
Monocyte	(0.28–0.86×103/µL)	805	458	844	641	0.824
Lymphocyte	(0.88–2.89×103/µL)	1670	1245	1559	641	0.608
NLR		12.9	11.8	11.7	10.3	0.640
PLR		275	236	307	267	0.620
LMR		1.79	1.29	2.38	2.36	0.373
SIRI		10519	11180	7800	7030	0.506
PNI		41.5	8.31	45.6	5.41	0.039 (*)

SD: Standart deviation, n: Number of patients, P: Statistical significance, AST: Aspartate aminotransferase, LDH: Lactate dehydrogenase, WBC: White blood cell, CRP: C-reactive protein, NLR: Neutrophil/lymphocyte ratio, PLR: Platelet/lymphocyte ratio, LMR: Lymphocyte/monocyte ratio, SIRI=(neutrophil × monocyte/lymphocyte), PNI=10× serum albumin (g/dL)+0.005 total lymphocyte count (per mm3). (*): Only the statistically significant values are given in the Table.

significant difference between the two periods. However, PNI values were statistically significantly higher during the COVID period. Laboratory findings and inflammatory markers from both periods are shown in Table 2. When the two periods were compared, Ranson scores were statistically significantly higher during COVID than pre-COVID (P=0.030). Ranson scores for both groups are shown in Figure 4.

Abdominal computerized tomography (Ab-CT) was performed in all but two patients in the pre-COVID era and in all patients during the COVID era. Magnetic resonance imaging (MRI) was performed on all patients with elevated bilirubin levels but could not be performed on four patients during the COVID period. The details of the radiological findings of the patients for both periods are given in Table 3.

Seven patients in the pre-COVID period and two in the COVID were cholecystectomized. The cholecystectomy rate after acute attacks decreased from 26% (13/50) in the pre-COVID period to 15.6% (5/32) during COVID. A statistically significant difference was not detected (P=0.23). The timing of cholecystectomy is detailed in Table 4. ERCP was applied to 8/57 (14%) and 10/34 (29.4%) patients in the pre-COVID and COVID periods, respectively. There was no statistical difference between the two groups. The recurrence rate after the first ABP attack was significantly higher in the COVID

Table 3. Radiologic findings of pre-COVID and COVID patients

Imaging tests (findings)	Pre-Covid Frequency	%	Covid Frequency	%
USG	25/57	43.85	20/34	58.82
Acute cholecystitis	10	17.54	7	20.58
Intra-extrahepatic dilatation	8	14.03	6	17.64
CT	55/57	96.49	34/34	100
Eodema	53	92.98	34	100
Necrosis	2	3.5	0	0
Acute cholecystitis	11	19.29	3	8.82
IEHD	12	21.05	7	20.58
AC findings and IEHD	8	14.03	6	17.64
MR/MRCP	23/57	40.39	18/34	52.94

Ab-CT: Abdominal computerized tomography; MR/MRCP: Magnetic resonance imaging/magnetic resonance colangiopancreaticography; AC: Acute cholecystytis; IEHD: Intra-extrahepatic dilatation; USG: Ultrasonography.

Table 4. Timing of cholecystectomy in pre-COVID and COVID periods

Time of cholecystectomy	Pre-COVID (n=50)†		COVID (n=32)†		
	Frequency	%	Frequency	%	
Index (72 h)	0	0	0	0	
<4 weeks	4	8	1	3.1	
4–8 weeks	2	4	3	9.3	
9–16 weeks	2	4	1	3.1	
17–24 weeks	2	4	0	0	
24–52 weeks	1	2	0	0	
>52 weeks	2	4	0	0	
Total	13	26	5	15.6	P=0.23

†: The patients that are already cholecystectomized before ABP are extracted from the total number of patients.

pandemic compared to the pre-COVID period, at 10/34 (29.4%) and 6/57 (10.5%) patients, respectively (P=0.043).

DISCUSSION

The COVID-19 pandemic has deeply affected the health-care system, especially elective health-care delivery. It has been shown that patients avoid even emergency medical services during the pandemic due to the anxiety of contracting the disease and other restrictions. Du et al. reported that while admissions for AP were 279 patients during COVID-19, it was 457 patients in the equivalent period in 2019.[6] In our study, the number of patients admitted with ABP during COVID-19 decreased by 40.3% compared to the previous year, decreasing from 57 patients to 34 patients. In times of the highest number of new cases, the number of patients admitted to the ER decreased to one per month.

Yawar et al. found hypertension to be the most common cause of comorbidity in patients with AP during the COVID period.[7] In our study, hypertension was the most common cause of comorbidity in both periods. However, DM was significantly more common in the COVID period than pre-COVID.

Early access to radiological examinations is important in AP to detect biliary etiology. Abdominal ultrasonography (USG) is extremely effective in detecting cholelithiasis. Still, the impact of magnetic resonance colangiopancreaticography (MRCP) in demonstrating choledochal calculus and Ab-CT for AP severity scoring is indisputably superior to USG alone.[4] Early diagnosis provides the advantages of prompt fluid-electrolyte resuscitation, pain relief, and early initiation of treatments such as nutritional support in ABP. Studies have shown that timely initiation of ABP therapy is important for improving tissue hypoperfusion, reducing the inflammatory response, and minimizing mortality.[6] It was also reported that there was a decrease in the number of daily USG and computed tomography scans when the health system was locked down.[10] In our study of ABP patients, no statistical difference was found in the volume of USG, Ab-CT, and MRI in the COVID period compared to the pre-COVID period. During the COVID period, 18.2% (4/22) of the patients with high bilirubin levels could not undergo MRCP.

Çolak and Çiftci did not detect a statistically significant difference in Ranson score in terms of COVID and pre-COVID period averages of 2.90±0.34 and 2.12±0.22, respectively (P=0.053). Although it is not statistically significant, it is clear that there is a very clear difference.[11] In our study, there were no patients presenting with Ranson 0 during the COVID period. In addition, the number of applicants with Ranson 4 was higher in the COVID era than pre-COVID. Ranson scores were statistically significantly higher during COVID than pre-COVID (P=0.030).

Many biliary problems, such as recurrent pancreatitis attacks, mechanical icterus, and cholangitis, may occur if prompt radical treatment is not started after the ABP attack. An increase in biliary complications has been reported in patients who did not undergo cholecystectomy.[12] Today, although the role of cholecystectomy in preventing post-ABP biliary events and recurrent ABP attacks is undisputed, there are still some debates about the timing of gallbladder removal.[5,13] Early index cholecystectomies have been recommended in mild-attack ABP in recent years. However, in severe ABP, it is generally recommended to perform cholecystectomy at least 6 weeks after the onset of the attack.[14] In mild ABP, the hospitalization time is significantly shorter in early cholecystectomies compared to late cholecystectomies.[15,16] Van Baal et al. reported the rate of readmission as 18% in the time between discharge and interval cholecystectomy. They stated that recurrent ABP was the most common reason for hospitalization during this period.[17] Generally, the limitation of index cholecystectomy is the concern that the operation will be difficult during acute inflammation and the belief that the risk of biliary tract injury may be high.[5] Although there is a strong consensus on performing index cholecystectomy, especially in mild ABPs, the response to perform a cholecystectomy in the first 48–72 h of daily practice is far lower than expected. In daily practice, interval cholecystectomy rates seem higher than early cholecystectomy. However, despite all recommendations, it was found that 25–50% of ABP patients did not undergo cholecystectomy for various reasons.[18,19] Nguyen et al. reported that the rate of cholecystectomy for ABP increased in hospitals with a high volume of cholecystectomy performed for any indication. It has been stated that this may be due to uneventful hospital structures in terms of post-surgical care and where surgeons can be used more. The same study found that the cholecystectomy rate after ABP decreased as hospital admissions for pancreatitis increased.[20]

Since we are a university hospital, the number of malignancies and emergency operations is high. We prefer to perform interval cholecystectomy after medical treatment for ABP. In our study, cholecystectomy was performed at a rate of 26% in the pre-COVID period. Since we are a university hospital, prioritizing tumors and emergency cases is important. However, in the pre-COVID period, nine (15.7%) patients were hospitalized in the last six weeks. The surgery appointments of these patients were postponed due to COVID period. This is one of the reasons why our rate was 26% in the pre-Covid era. During the COVID period, we performed cholecystectomy at a rate of 15.6%. Compared to the previous year, the cholecystectomy rate for ABP decreased by 10.4%. Eight of the nine patients who applied in the two months before the COVID pandemic was declared have not had cholecystectomy yet. One was operated on approximately 23 months later. As can be seen, even pre-COVID patients were affected by the COVID pandemic regarding performing cholecystectomies. In fact, in the pre-COVID period, post-ABP cholecystectomy rates were already low, whereas during the COVID period, they were reduced by 10.4%. While 30.8% (4/13) of cholecystectomy was performed after ABP in the pre-COVID period, only 1 patient (1/5) underwent cholecystectomy in the first 4 weeks of the COVID period. Similarly, some studies reported up to 25% reductions in elective surgeries and up to 18% in emergency cases during the pandemic. Significant reductions in thyroidectomy, anal region surgeries, hernias, and cholecystectomies have been reported.[21,22]

A study from Ireland reported their pre-COVID algorithm to perform index cholecystectomy in the first 2 weeks in cases of rapid pancreatitis recovery in mild ABP patients. Still, they did not continue in their routine of employing index cholecystectomy during the COVID period. Cholecystectomy was performed in only 4 patients out of 19 total who were followed up with ABP during COVID-19. Biliary events were reported after ABP in four patients, including recurrent pancreatitis.[7] In our study, when the two groups were compared according to the recurrence rates after the first ABP attack, it was seen that the recurrence rate was statistically significantly higher in the COVID period. While there were 10 (29.4%) recurrence ABP attack in total after the first ABP attacks in the COVID period, this number was 6 (10.5%) in the pre-COVID period (P=0.043).

Although no evidence suggests that routine endoscopic retrograde cholangiopancreatography (ERCP) in ABP reduces mortality or complications, early ERCP is recommended in patients with cholangitis or biliary obstruction.[23,24] In ABP accompanied by cholangitis, ERCP accelerates recovery in the clinical course by performing early bile decompression.[6] The view of accelerating healing by providing biliary decompression with ERCP in cases where cholangitis accompanies ABP is an approach adopted in our clinic. However, there was no need for many ERCPs during the treatment of attacks in ABP patients in both groups. In our study, because the ABP attack was accompanied by cholangitis in only one patient in each group, ERCP was performed in only one patient in each group.

CONCLUSION

As a result, we found that patients admitted with ABP decreased significantly during the COVID period compared to the previous year. In our ABP patients, the rate of cholecystectomy during the COVID period decreased significantly, and the operations were significantly delayed compared to the pre-COVID period. The number of patients presenting with relapses of ABP during the COVID period also increased. The surgeries of patients hospitalized in the last months of the pre-COVID period whose surgery appointments coincided with the 1st months of the COVID pandemic were postponed. These patients were affected as much as when the system was locked.

We believe that the COVID-19 pandemic has caused significant disruptions in treating ABP. The limitations of our study are the retrospective nature and the lower number of cases because it is a single-center study.

Ethics Committee Approval: This study was approved by the University of Health Sciences Trakya University Ethics Committee (Date: 06.09.2021, Decision No: 2021/346).

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: Z.T.; Design: Z.T., I.E.C.; Supervision: Z.T.; Resource: T.D., Y.E.A.; Materials: Z.T., T.D., I.E.C.; Data collection and/or processing: Z.T., Y.E.A.; Analysis and/or interpretation: T.D., İ.E.C.; Literature search: Y.E.A.; Writing: Z.T., T.D.; Critical review: Z.T., T.D.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Ne değişti? COVID-19 pandemisinin akut biliyer pankreatit tedavisine etkisi

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AMAÇ: COVID-19 Pandemisi, tıptaki günlük uygulamaları kökten değiştirdi. COVID-19 Pandemisinin, akut biliyer pankreatitli (ABP) hastalarda yönetim stratejilerimiz üzerindeki etkisini retrospektif olarak değerlendirmeyi amaçladık.

GEREÇ VE YÖNTEM: Trakya Üniversitesi Tıp Fakültesi'nde 15 Mart 2019-15 Mart 2021 tarihleri arasında tedavi edilen ABP'li toplam 91 hasta geriye dönük olarak incelendi. Hastalar COVID öncesi ve COVID dönemi hastaları olarak sınıflandırıldı. Komorbidite belirteçleri, laboratuvar testlerinden elde edilen veriler, inflamatuar belirteçler ve radyolojik incelemeler değerlendirildi. Hastanede yatış süresi, yoğun bakım ihtiyacı, morbidite, mortalite, tekrarlayan ABP ve kesin tedavi oranları değerlendirildi ve iki döneme ait veriler karşılaştırıldı.

BULGULAR: Çalışmaya COVID öncesi dönemde 57 ve COVID döneminde 34 olmak üzere iki hasta grubu dahil edildi. Ulusal yeni COVID-19 tanıları arttığı dönemlerde ABP başvurularının önemli ölçüde azaldığını saptadık. Tip 2 Diyabet (T2DM) COVID dönemindeki hastalarda anlamlı olarak yüksekti (p=0.044) ve COVID hastalarında anlamlı olarak daha yüksek total (p=0.004), direkt bilirubin (p=0.007) ve lipaz değerleri (p<0.001) vardı. Atak sonrası kolesistektomi oranı, COVID öncesi dönemde %26'dan COVID sırasında %15,6'ya düştü.

SONUÇ: COVID-19 pandemisi, ABP hastalarının erken evrede hastanelere başvurularını çarpıcı bir şekilde azalttı ve kaçınılmaz şekilde geç başvurulara yol açtı. Ayrıca ABP'nin tekrarlama oranlarında anlamlı bir artış tespit edildi. Bu durum atak sonrası kolesistektomi oranlarındaki azalma ile açıklanabilir.

Anahtar sözcükler: Akut biliyer pankreatit; COVID-19; COVID dönemi; SIRI; kolesistektomi.

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