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The effect of the COVID-19 pandemic period on the cases of acute cholecystitis

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ABSTRACT

Aim: A gallstone is a stone formed within the gallbladder out of precipitated bile components. Risk factors for gallstones include a family history of gallstones, age, genetic and environmental factors, sedentary lifestyle, high-fat diet, obesity. In this study, it was aimed to determine the effects of the pandemic process on acute cholecystitis cases.

Material and Method: Patients who applied to hospital between 1st January 2018 and 1st January 2022 and were diagnosed with Acute Cholecystitis were retrospectively screened. The demographic data as age and sex were recorded by dividing the patients into two groups, two years before and two years after the COVID-19 pandemic period.

Results: The 2-year retrospective evaluation before and after the COVID-19 pandemic, a significant increase was found in cases of acute cholecystitis after the pandemic ($p<0.05$).

Conclusion: Sedentary lifestyle and obesity are important factors in the etiology of acute cholecystitis. The COVID-19 pandemic, an increase in the number of acute cholecystitis have been clearly demonstrated by this single center data.

Keywords: Acute cholecystitis, COVID-19, pandemic period

INTRODUCTION

Cholecystitis or inflammation of the gallbladder, is a clinical condition that describes inflammation of the gallbladder with symptoms of right upper quadrant pain, nausea, vomiting, and sometimes fever (1). Acute cholecystitis is caused by obstruction of the cystic duct by gallstones or particles in more than 90% of cases (2). Important risk factors leading to gallstones include age, genetic and environmental factors, sedentary life, high-fat diet, obesity, birth control pills, pregnancy, presence of this condition in other family members, diabetes mellitus, liver disease or rapid weight loss (3). Additionally, etiology of acute cholecystitis other than stone includes vasculitis, chemotherapy, major trauma and malignant processes, albeit rarely (3,4).

The diagnosis of acute cholecystitis is made by clinical symptoms, laboratory and radiological tests. Abdominal ultrasound is one of the leading radiological methods used to confirm the diagnosis (5). In addition to Murphy's sign in clinical physical examination, increase in leukocyte level, liver function tests, gallbladder wall thickness, gallbladder fullness, pericholecystic fluid and air in the gallbladder wall can be counted among the data supporting the diagnosis of cholecystitis by USG (6).

Although there are a sufficient number of studies in the literature examining demographic, clinical, and laboratory data in patients with acute cholecystitis, immobilization, sedentary life, and obesity status due to quarantine during the COVID-19 pandemic period may suggest increased gallbladder stone pathologies and the risk of acute cholecystitis diagnoses.

In this study, it was aimed to determine the effects of the pandemic process on acute cholecystitis cases.

MATERIAL AND METHOD

The study was carried out with the permission of Medicana International Ankara Hospital Academic and Ethics Committee (Date: 05.02.2022, Decision No: BŞH-05). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

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Patients who applied to our Hospital between 1st January 2018 and 1st January 2022 and were diagnosed with Acute Cholecystitis were retrospectively screened.

Patients diagnosed with acute cholecystitis were determined clinically, laboratory, and radiologically, regardless of age. The first COVID-19 case in Turkey was announced on March 11, 2020. The patients were divided into two groups, 2 years before and two years after this period. The demographic data as age and sex were recorded by dividing the patients into two groups, two years before and two years after the COVID-19 pandemic period.

Statistical Analysis

SPSS software (SPSS 18.0, Chicago, Illinois, USA) was used for statistical analyses. Data were expressed as mean±SD. T-test was used to compare the parameters of patients. A P-value cutoff less than 0.05 was considered statistically significant.

RESULTS

Patients who applied to Medicana International Ankara Hospital between 1st January 2018 and 1st January 2022 and were diagnosed with Acute Cholecystitis were retrospectively screened. Total of 4,403 patients diagnosed with Acute Cholecystitis were investigated for the study.

The mean age of the patients was 39.75±16.8 years, and 18.78 (42.65%) of the patients were male. Since it was considered as 2 years before and two years after the pandemic, a total of 1,878 patients were diagnosed with acute cholecystitis between January 2019 and January 2020, and 1,096 (58.36%) of the patients were women.

Considering the pandemic period from January 2020 to January 2022, a total of 2,525 (57.35%) patients were diagnosed with acute cholecystitis, and 1,429 (56.6%) of the patients were women. The demographic characteristics of the patients with acute cholecystitis are summarized in **Table 1**.

The 2-year retrospective evaluation before and after the COVID-19 pandemic, a significant increase was found in cases of acute cholecystitis after the pandemic ($p < 0.05$).

Acute cholecystitis was more common in women in both groups in the pre-pandemic and post-pandemic 2-year period, but there was no statistically significant difference between the groups since age was taken into account ($p > 0.05$).

DISCUSSION

Cholelithiasis is seen at a rate of 10-15% in the general population, and they have common risk factors including type 2 DM, hyperlipidemia, insulin resistance, metabolic syndrome, rapid weight loss (7). Also, obesity is a risk factor for the formation of cholesterol gallstones and exposes patients to increased risk of gallstone-related complications and cholecystectomy (8, 9).

A systematic review of 17 prospective studies involving 1,921,103 participants found two-fold increased risk of gallbladder disease from the lower to the upper limit of the normal BMI range (18.5–24.9 kg/m²). They also suggest that even moderate increases in adiposity increase risk of gallbladder disease. Also, hormone changes and gallbladder dysmotility are the most immportant mechanisms to explain the association between obesity and gallbladder disease (10). Together, lifestyle and dietary factors, in particular, might either indirectly (e.g., inducing overweight, obesity, insulin resistance and the metabolic syndrome) or directly (e.g. dietary content in fiber and specific macronutrients) interfere with the pathogenesis of cholesterol gallstones acting on common pathogenic pathways (9, 10).

Additionally, insulin resistance is an important risk factor in the formation of cholelithiasis. In recent experimental studies, Mendez-Sanchez et al. (11) reported that insulin resistance causes cholesterol gallstone formation by increasing cholesterol secretion into bile. Thus, Ata et al. (12) reported that insulin resistance increases gallstone formation in non-obese and non-diabetic patients. In addition, a sedentary lifestyle is considered one of the main causes of insulin resistance. While a sedentary lifestyle is the source of many diseases, it also accelerates the increase in obesity, which is an important social health problem.

Table 1. Demographic characteristics of patients with Acute Cholecystitis

Date	Number of patients		Male /female	p
Jan 2018-Jan 2020	4403	1878 (42.65%)	782 (41.64%)/1096 (58.36%)	<0.05
Jan 2020-Jan 2022		2525 (57.35%)	1096 (43.40%)/1429 (56.6%)	

Table 2. Age distribution of patients with Acute Cholecystitis

Date	Number of patients		Male /female age		p
Jan 2018-Jan 2020	4403	1878 (42.65%)	39.75±16,8	43.3/47.6	>0.05
Jan 2020-Jan 2022		2525 (57.35%)		53.1/57.4	

Besides a close relationship can be established between COVID-19 infection and sedentary life. Amongst these immune-debilitating diseases, COVID-19 infection is common in diabetic patients related to the absence of a normal active immune system to fight the COVID-19. Recovery of patients having a history of diabetes from COVID-19 has several complications, and their management becomes cumbersome (13). Furthermore, cholesterol lewel can indirectly increase the susceptibility of patients to COVID-19 and increase the risk of death from COVID-19 (13-15). Thus, COVID-19 confers an increased risk for type 2 diabetes (16).

All together, during COVID-19 infection the inactivity triggered by the epidemic immobility process can be considered as the main source of the increase in obesity. In the light of all these data, our study supported the hypothesis that the sedentary life caused by the COVID-19 pandemic process causes an increase in hiperlipidemia, insulin resistance as a result, an increase in gallbladder pathologies and acute cholecystitis.

Our study has some limitations. The first was a single-center, retrospective study, and the small number of the study population was an important limiting factor. Second, laboratory, BMI, and radiological imaging were not investigated in the study. In addition, patients diagnosed with acute cholecystitis were included in the study regardless of whether they were positive or negative for COVID-19. However, these restrictions did not affect the results.

CONCLUSION

The superior aspects of our work; it is important in showing the increase in acute cholecystitis cases and presenting local data during the pandemic process. As a result; a sedentary life, immobility, and obesity are important factors in the etiology of acute cholecystitis. The COVID-19 pandemic process, gallstone formation, and an increase in the number of acute cholecystitis have been clearly demonstrated by single-center data. For data with higher levels of evidence, multicenter studies with more parameters are needed.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Medicana International Ankara Hospital Academic and Ethics Committee (Date: 05.02.2022, Decision No: BŞH-05).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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