Journal of Experimental and Clinical Medicine
https://dergipark.org.tr/omujecm

Research Article

J Exp Clin Med
2022; 39(1): 164-168
doi: 10.52142/omujecm.39.1.33

Effects of COVID-19 pandemic on management of acute cholecystitis: A single tertiary center's experience

Murat DEREBEY[1,*], Mahmut Arif YÜKSEK[1], Ufuk KARABACAK[2], Vahit MUTLU[3], Salih Raşit MİZAN[1], İsmail Alper TARIM[1], Aysu Başak ÖZBALCI[4], Senem KOÇ[5], Bülent GÜNGÖR[1], Ayfer Kamalı POLAT[1], Mahmut BAŞOĞLU[1]

[1]Department of General Surgery, Faculty of Medicine, Ondokuz Mayis University, Samsun, Turkey
[2]Department of Surgical Oncology, Faculty of Medicine, Cumhuriyet University, Sivas, Turkey
[3]Department of General Surgery, Tokat State Hospital, Tokat, Turkey
[4]Department of Radiology, Faculty of Medicine, Ondokuz Mayis University, Samsun, Turkey
[5]Department of Medical Statistics, Faculty of Medicine, Nisantasi University, İstanbul, Turkey

Received: 27.07.2021 • **Accepted/Published Online:** 02.08.2021 • **Final Version:** 01.01.2022

Abstract

Following the spread of novel coronavirus (COVID-19) pandemic, surgical associations have issued their different recommendations for managing the acute cholecystitis (AC) clinic during the pandemic. We aimed to examine the effects of the COVID-19 pandemic period on our clinical approach in patients who presented to the emergency department with abdominal pain and were diagnosed with AC. Medical records of patients diagnosed with AC in the emergency room between 11 March 2020 and 10 March 2021 and in the same period of one year before the pandemic were retrospectively reviewed. Patients were divided into 2 groups as COVID-19 period (Group 1) and non-COVID period (Group 2). Demographics and clinical characteristics, treatment modalities, and outcomes of these two groups were compared. The number of patients diagnosed with AC in the emergency department decreased during the ongoing COVID-19 pandemic. When the time between the onset of the complaints and the admission to the emergency service was evaluated, no statistically significant difference was found between the groups ($p>0.05$). The distribution of cholecystitis type and TG18 severity grading for AC were similar in both groups ($p>0.05$). While percutaneous cholecystostomy (PC) is more preferred in the treatment of AC during the pandemic period and the number of delayed interval laparoscopic cholecystectomy decreased, AC management was similar in both periods with no significant statistical difference ($P>0.05$). In conclusion, our clinical approach and management in the treatment of AC did not differ when compared to the pre-pandemic period.

Keywords: acute cholecystitis, COVID-19, treatment modality, clinical approach

1. Introduction

Acute cholecystitis (AC) is one of the most common gastrointestinal diseases and is considered a surgical emergency. The most common cause of AC is gallstone-related but may also be associated with diabetes, immunosuppression, chronic kidney disease, viral illness, hemoglobinopathies, or vasculitis (1,2). The severity of AC was classified into three grades by Tokyo guidelines 2018 (TG 2018), as mild (grade I), moderate (grade II), and severe (grade III) (3,4). Early cholecystectomy (EC) during first admission is the preferred treatment method in patients suitable for surgery. Laparoscopic cholecystectomy (LC) is considered the "gold standard" for the surgical treatment of AC (5). Surgical management of critically ill patients remains a controversy due to high risk of postoperative morbidity and mortality (6,7). Therefore, percutaneous cholecystostomy (PC) can be valuable treatment as an alternative to EC in high-risk patients and in those with moderate or severe cholecystitis (8).

The novel coronavirus (COVID-19) pandemic was first reported in December 2019 in Wuhan, Hubei Province of China, and spread rapidly all over the World. On March 11, 2020, The World Health Organization (WHO) declared COVID-19 a global pandemic and recommended that all possible intervention procedures and surgeries be postponed except in very urgent situations (9). The American College of Surgeons COVID-19 Elective Case Triage Guide (2020) advised that LC should be performed healthy patients with AC to minimize hospital stay, and if the patient is too high risk for surgery or operating room conditions are not available, IV antibiotics should be administered. In this guideline, PC was recommended in addition to antibiotic administration for patients who did not improve clinically with antibiotics and had signs of sepsis.The present study aims to examine the effects of the pandemic period on our clinical approach in patients admitted to the emergency department with the complaint of abdominal pain and diagnosed with AC.

* Correspondence: mderebey@gmail.com

2. Materials and Methods

This study was carried out in the General Surgery Clinic of Ondokuz Mayis University Medical Faculty Hospital. Ethical approval was obtained from the local ethics committee for the study (IRB approval number OMU: 2021/168). The first COVID-19 case in Turkey was announced on March 11. The medical records of patients who presented to the emergency department with the complaint of abdominal pain between 11 March 2020 and 10 March 2021 and in the same period of one year before the pandemic and were diagnosed with AC according to the Tokyo 2018 guideline were retrospectively reviewed. Patients with acute cholangitis or acute pancreatitis accompanying AC and outpatients whose data were not accessible were excluded this study. Patients were divided into 2 groups as COVID-19 period (Group 1) and non-COVID period (Group 2). Age, gender, time between the onset of complaints and admission to the emergency room, C-reactive protein (CRP), white blood count (WBC), alanine transaminase (ALT), aspartate transaminase (AST), total and direct bilirubin, TG18 severity grading for AC, type of cholecystitis, COVID 19 status, patient management, length of hospital stay, bile duct injury and mortality rates were determined as parameters to be investigated. During the pandemic, chest computed tomography (CT) was performed and COVID-19 test was applied to all patients who were asked for surgical consultation in the emergency department. Patients with suspicious lesions showing COVID-19 pneumonia on chest CT were approached as positive for COVID-19, and optimum isolation conditions were attempted to be provided in these patients. PCR test results of the patients were followed. Patients with positive PCR tests were admitted to COVID-19 isolation wards. In the presence of symptoms such as shortness of breath, cough, fever, or worsening of vital signs, COVID-19 tests and chest CT were repeated, even if this was due to any other medical reason.

2.1. Statistical analysis

For statistical data analysis SPSS 21 (Statistical Package for the Social Sciences) program was used. As a first step in SPSS, descriptive statistics and normalization test was performed to analyze if the data were normally distributed. As a result of the normalization test according to Kolmogorov Smirnov the data was not normal distributed. Considering that the distribution was not normal, Mann Whitney U test which is a nonparametric test was used to find significance. Also Chi-Squared test was performed for the data.

3. Results

In the present study, one year covering the COVID-19 period and the other one year non-COVID period, 91 patients in the emergency department before the pandemic and 67 patients during the pandemic period was diagnosed with AC. The number of patients diagnosed with AC in the emergency department decreased during the ongoing COVID-19 pandemic. The age and gender distribution were similar between the groups ($p>0.05$). When the time between the onset of the complaints and the admission to the emergency service was evaluated, no statistically significant difference was found between the groups ($p>0.05$). Laboratory values were presented in Table 1 ($p<0.05$). The distribution of cholecystitis type and TG18 severity grading for AC were similar in both groups ($p>0.05$). When the treatment approaches of AC were evaluated, although there was no statistically significant difference between the groups, it was observed that more PC was preferred in addition to antibiotic treatment during the pandemic period, and the number of delayed interval laparoscopic cholecystectomy decreased. There was no statistical difference between the groups in terms of length of hospital stay (LOS) (Seven days for group 1 and 6 days for group 2, $p>0.05$).

Strasberg Type A bile duct injury occurred in 1 patient in Group 1 and in 2 patients in Group 2 ($p>0.05$). Bile leakage managed with endoscopic retrograde cholangiopancreatography and biliary stenting in all patients. While the COVID-19 test was positive in 2 patients at the time of diagnosis of AC during the pandemic period, COVID-19 was detected in 4 patients who were hospitalized for AC and whose tests were repeated with suspicious symptoms. Mortality rates were similar in both groups, four (6%) patients in Group 1 and 6 (6.6%) patients in Group 2 died ($p>0.05$). One of the two patients who underwent open cholecystectomy (OC) due to gallbladder perforation during the pandemic period contracted COVID-19 in the postoperative follow-up and died secondary to COVID-19 pneumonia. The other patient who was operated on died due to acute coronary syndrome. One patient who underwent PC died due to pulmonary embolism and the other patient with a history of lung cancer died due to sepsis. In the non-COVID period, three patients, one of whom was a postoperative patient, died due to sepsis, two patients died due to acute coronary syndrome and 1 patient died due to pulmonary embolism.

4. Discussion

All current guidelines recommend LC as the gold standard treatment for AC, as it provides better outcomes in terms of mortality, morbidity, and postoperative hospital stay. World Society for Emergency Surgery (WSES) guidelines emphasize that early laparoscopic cholecystectomy (ELC) should be performed as soon as possible (11) Murray et al. (2018) investigated the timing of surgery for AC and reported the rate of EC as 52.7% in the USA and 15.7% in the UK. They noted that the rate of LC in these patients was 82.8% and 37.9% for the USA and UK, respectively. We mostly do not prefer EC in the treatment of AC due to the high intensity of the operating room caused by working in a tertiary center. While our rate of ELC was 11% in the pre-pandemic period, this rate was 10.4% in the pandemic period, and the rates are similar. The similarity of the results indicates that early surgery is performed in emergency conditions in patients who absolutely need surgery in both periods.

Table 1. Demographics and clinical features, laboratory values, management of acute cholecystitis and treatment outcomes of patients admitted to the emergency department due to AC during the COVID-19 pandemic and pre-pandemic period

	Group I (COVID-19)	Group II (Non-COVID)	P value
Total number fo patients	67 (42.4%)	91 (57.6%)	
Age	63.6 ± 17.04	62.99 ± 17.63	0.827
Gender			
Male	32 (47.8%)	44 (48.4%)	0.941
Female	35 (52.2%)	47 (51.6%)	
Time between the onset of complaints and admission to the emergency room			
< 24 hours	18 (26.9%)	25 (27.5%)	0.985
≥ 24 hours and < 48 hours	14 (20.9%)	18 (19.8%)	
≥ 48 hours	35 (52.2%)	48 (52.7%)	
C-reactive protein (CRP) (mg/L)	145.7 ± 120	113.3 ± 82.9	0.924
White blood count (WBC) ($\times 10^9$/L)	14194 ± 8201	13092 ± 7079	0.273
Alanine transaminase (ALT) (IU/L)	150.2 ± 205.7	114.1 ± 214.8	0.108
Aspartate transaminase (AST) (IU/L)	169.7 ± 251.4	132.7 ± 337.9	0.065
Bilirubin total (mg/dL)	2.09 ± 2.38	2.15 ± 2.49	0.707
Bilirubin direct (mg/dL)	1.43 ± 2.23	1.45 ± 2.06	0.820
Tokyo Guidelines 2018 severity grading for acute cholecystitis			
Grade I (mild) acute cholecystitis	33 (49.3%)	56 (61.5%)	0.123
Grade II (moderate) acute cholecystitis	21 (31.3%)	16 (17.6%)	
Grade III (severe) acute cholecystitis	13 (19.4%)	19 (20.9%)	
Type of cholecystitis			
Calculous	63 (94%)	84 (92.3%)	0.674
Acalculous	4 (6%)	7 (7.7%)	
COVID 19 Status			
Positive at the time of diagnosis	2 (3%)	-	
Positive on follow-up time	4 (6%)	-	
Index admission early laparoscopic cholecystectomy			
No	67 (100)	88 (96.7%)	0.133
Yes	0	3 (3.3%)	
Index admission open cholecystectomy			
No	60 (89.6%)	84 (92.3%)	0.371
Yes	7 (10.4%)	7 (%7.7%)	
Non-operative management			
Conservative management with antibiotics	42 (62.7%)	69 (75.8%)	0.092
Conservative management with antibiotics and percutaneous cholecystostomy	18 (26.9%)	12 (13.2%)	
Delayed interval laparoscopic cholecystectomy			
No	55 (82.1%)	64 (70.3%)	0.065
Yes	12 (17.9%)	27 (29.7%)	
Length of hospital stay (day)	10.43 ± 13.29	7.32 ± 6.31	0.172
Bile duct injury			
No	65 (97%)	90 (98.9%)	0.386
Yes	2 (3%)	1 (1.1%)	
Mortality			
No	63 (94%)	85 (93.4%)	0.573
Yes	4 (6%)	6 (6.6%)	

Following the spread of the COVID-19 infection, surgical associations have issued their recommendations for managing the effects of the pandemic on clinical practice. The UK's Intercollegiate General Surgery Guidelines on COVID-19 (2020) recommended non-surgical management whenever possible during the outbreak. The American Society of Gastrointestinal and Endoscopic Surgeons (2020) and the European Association of Endoscopic Surgery (2020), have recommended a patient- and hospital-centered approach. On the other hand, the American College of Surgeons (2020) emphasized that planned ELC through real-time reverse transcriptase polymerase chain reaction testing may be an option to consider. In an article published from Turkey, it was noted that LC in AC is a high-risk procedure for surgical teams during the COVID-19 pandemic. It was stated that PC is a potential alternative treatment method (17).

After WHO declared the COVID-19 pandemic, a study by the National Syndromic Surveillance Program found a 42% reduction in emergency room visits compared to historical trends, as well as a significant decrease in AC admissions to hospital (18). Due to the pandemic conditions, TG 18 grade I admissions decreased significantly, while severe cases (TG 18 grade II and III) remained stable. Cholecystectomy rates worldwide have fallen (19). In a recent study, surgeons opted for a non-surgical approach because of the COVID-19

pandemic in 97.2% of patients with mild-to-moderate cholecystitis defined according to the TG 18. The reason why non-surgical follow-up was preferred in this study was associated with the simultaneous service of the hospital operating room (20). However, it was determined that the LOS of the patients increased significantly due to the non-surgical treatments preferred during the pandemic period (Martínez et al. 2021). In our series, the number of patients diagnosed with AC in the emergency department during the pandemic period decreased. Although the number of TG 18 grade I patients decreased, the TG 18 grades were similar when both periods were compared and no statistically significant difference was found. While PC is more preferred in the treatment of AC during the pandemic period and the number of delayed interval laparoscopic cholecystectomy decreased, AC management was similar in both periods with no significant statistical difference (P>0.05).

Acalculous acute cholecystitis (AAC) is an acute necroinflammatory disease of the gallbladder with high morbidity and mortality rates. Most of these patients have trauma, major surgery, burns, cardiopulmonary resuscitation, mechanical ventilation, long-term total parenteral nutrition, and multiple risk factors that suppress the immune system (22, 23). COVID-19 infection increases the expression of proinflammatory cytokines such as IL-6 and tumor necrosis factor alpha. These cytokines activate the coagulation cascade and explain the thrombosis of vascular structures in the gallbladder and the formation of AAC with ischemic gangrene (24, 25). In the light of this information, it was investigated whether there was an increase in the frequency of AAC in our clinic during the pandemic period, but no significant difference was found compared to the pre-pandemic period.

The COVIDSurg Collaborative group stated that 26.1% of 1128 patients who underwent surgery during the COVID-19 pandemic developed COVID-19 infection, and about half of these patients progressed with pulmonary complications, and 23.8% of the patients died from these causes (26). Our mortality rates were similar between the groups in the patients we followed up for AC in our series. Discussions intensified over the question of whether we should change our surgical indications for emergencies in this global situation. Despite all these controversies, LC remains the first-line treatment for AC even during the COVID-19 pandemic (27). It is known that the COVID-19 virus is found in blood, gastrointestinal tissues, peritoneal fluid, feces, nasopharyngeal swab, sputum or tracheal aspirate (Brat et al. 2020). However, although SARS-Cov-2 RNA has recently been detected in the peritoneal cavity, there is no evidence to suggest the presence of the virus in surgical smoke. It is unclear whether aerosolized viral particles were exposed during laparoscopy. No evidence emerged that the risk of COVID-19 infection due to LC could be higher than OC for either patient or healthcare workers. Many studies recommend the use of ultralow particulate air filters to remove most viral particles and filter the pneumoperitoneum during laparoscopy (29, 30). Since we could not provide this filter in our hospital, we did not have the opportunity to use it during the ongoing pandemic.

The retrospective design of the study, the exclusion of patients whose data could not be reached, and the small number of patients are the main factors limiting the study. In our study, although the number of patients with AC who applied to the emergency department during the pandemic period decreased, the clinical approach and management in the treatment of AC did not differ when compared to the pre-pandemic period. Due to the large population we provide health services and the high density of operating rooms secondary to working in a tertiary center, we generally do not prefer early surgery in the treatment of AC unless it is necessary. We attribute the similarity of our results to this situation. Although the results in the two periods were similar, four of patients who were hospitalized for treatment with the diagnosis of AC during the ongoing pandemic period, were infected with COVID-19 and one of these patients who underwent emergency OC due to gallbladder perforation, died secondary to COVID pneumonia in the postoperative period. In the light of the literature, we should never forget the risk of morbidity and mortality caused by being infected with COVID-19 in patients who underwent surgery during the pandemic period.

Our clinical approach and management in the treatment of AC did not differ when compared to the pre-pandemic period. While emphasizing that the protection of healthcare providers is the top priority to ensure the sustainability of the healthcare system, we recommend a patient- and hospital-centered approach in the treatment of AC during the pandemic period.

Conflict of interest

None to declare.

Acknowledgments

None to declare.

References

1. Bala M, Mizrahi I, Mazeh H, Yuval J, Eid A, Almogy G. Percutaneous cholecystostomy is safe and effective option for acute calculous cholecystitis in select group of high-risk patients. European journal of trauma and emergency surgery : official publication of the European Trauma Society. 2016;42(6):761-6.

2. Aroori S, Mangan C, Reza L, Gafoor N. Percutaneous Cholecystostomy for Severe Acute Cholecystitis: A Useful Procedure in High-Risk Patients for Surgery. Scandinavian journal of surgery : SJS : official organ for the Finnish Surgical Society and the Scandinavian Surgical Society. 2019;108(2):124-9.

3. Yokoe M, Hata J, Takada T, Strasberg SM, Asbun HJ, Wakabayashi G, et al. Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos). Journal of hepato-biliary-pancreatic sciences. 2018;25(1):41-54.

4. Okamoto K, Suzuki K, Takada T, Strasberg SM, Asbun HJ, Endo I, et al. Tokyo Guidelines 2018: flowchart for the

management of acute cholecystitis. Journal of hepato-biliary-pancreatic sciences. 2018;25(1):55-72.

5. Ambe PC, Kaptanis S, Papadakis M, Weber SA, Zirngibl H. Cholecystectomy vs. percutaneous cholecystostomy for the management of critically ill patients with acute cholecystitis: a protocol for a systematic review. Systematic reviews. 2015;4:77.

6. Ambe PC, Weber SA, Christ H, Wassenberg D. Primary cholecystectomy is feasible in elderly patients with acute cholecystitis. Aging clinical and experimental research. 2015;27(6):921-6.

7. Winbladh A, Gullstrand P, Svanvik J, Sandström P. Systematic review of cholecystostomy as a treatment option in acute cholecystitis. HPB : the official journal of the International Hepato Pancreato Biliary Association. 2009;11(3):183-93.

8. Miura F, Takada T, Strasberg SM, Solomkin JS, Pitt HA, Gouma DJ, et al. TG13 flowchart for the management of acute cholangitis and cholecystitis. Journal of hepato-biliary-pancreatic sciences. 2013;20(1):47-54.

9. Stahel P. How to risk-stratify elective surgery during the COVID-19 pandemic? Patient Safety in Surgery. 2020;14.

10. American College of Surgeons (ACS). COVID 19: Elective Case Triage Guidelines for Surgical Care. Available from: https://www.facs.org/covid-19/clinical-guidance/elective-case. Accessed March 24, 2020.

11. Ansaloni L, Pisano M, Coccolini F, Peitzmann AB, Fingerhut A, Catena F, et al. 2016 WSES guidelines on acute calculous cholecystitis. World Journal of Emergency Surgery. 2016;11(1):25.

12. Murray AC, Markar S, Mackenzie H, Baser O, Wiggins T, Askari A, et al. An observational study of the timing of surgery, use of laparoscopy and outcomes for acute cholecystitis in the USA and UK. Surgical endoscopy. 2018;32(7):3055-63.

13. Royal College of Surgeons of England. Updated Intercollegiate General Surgery Guidance on COVID-19. Available from: https://www.rcseng.ac.uk/coronavirus/joint-guidance-for-surgeons-v2/. Accessed March 26, 2020.

14. EAES. Category: COVID-19 Statements. Availabe from: https://eaes.eu/category/covid-19-statements/.

15. SAGES. SAGES COVID-19 / Coronavirus Announcement Archives. Available from: https://www.sages.org/category/covid-19/.

16. American College of Surgeons. Local Resumption of Elective Surgeries Guidance. Available at: https://www.facs.org/covid-19/clinical-guidance/resuming-elective-surgery. Accessed on 7 May 2020.

17. Gok AFK, Eryılmaz M, Ozmen MM, Alimoglu O, Ertekin C, Kurtoglu MH. Recommendations for Trauma and Emergency General Surgery Practice During COVID-19 Pandemic. Ulusal travma ve acil cerrahi dergisi = Turkish journal of trauma & emergency surgery : TJTES. 2020;26(3):335-42.

18. Hartnett KP, Kite-Powell A, DeVies J, Coletta MA, Boehmer TK, Adjemian J, et al. Impact of the COVID-19 Pandemic on Emergency Department Visits - United States, January 1, 2019-May 30, 2020. MMWR Morbidity and mortality weekly report. 2020;69(23):699-704.

19. Manzia TM, Angelico R, Parente A, Muiesan P, Tisone G. Global management of a common, underrated surgical task during the COVID-19 pandemic: Gallstone disease - An international survery. Ann Med Surg (Lond). 2020;57:95-102.

20. Çiyiltepe H, Yıldırım G, Fersahoğlu MM, Aydın MT, Özcabı Y, Bulut NE, et al. Clinical approach to patients admitted to the emergency room due to acute cholecystitis during the COVID-19 pandemic and percutaneous cholecystostomy experience. Ulusal travma ve acil cerrahi dergisi = Turkish journal of trauma & emergency surgery : TJTES. 2021;27(1):34-42.

21. Martínez Caballero J, González González L, Rodríguez Cuéllar E, Ferrero Herrero E, Pérez Algar C, Vaello Jodra V, et al. Multicentre cohort study of acute cholecystitis management during the COVID-19 pandemic. European journal of trauma and emergency surgery : official publication of the European Trauma Society. 2021;47(3):683-92.

22. Jones MW, Ferguson T. Acalculous Cholecystitis. [Updated 2021 Feb 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459182/.

23. Mattone E, Sofia M, Schembari E, Palumbo V, Bonaccorso R, Randazzo V, et al. Acute acalculous cholecystitis on a COVID-19 patient: a case report. Ann Med Surg (Lond). 2020;58:73-5.

24. van der Poll T, Jansen PM, Van Zee KJ, Welborn MB, 3rd, de Jong I, Hack CE, et al. Tumor necrosis factor-alpha induces activation of coagulation and fibrinolysis in baboons through an exclusive effect on the p55 receptor. Blood. 1996;88(3):922-7.

25. Stouthard JM, Levi M, Hack CE, Veenhof CH, Romijn HA, Sauerwein HP, et al. Interleukin-6 stimulates coagulation, not fibrinolysis, in humans. Thrombosis and haemostasis. 1996;76(5):738-42.

26. Dell A, Harky A, Yıldız A, Lunevicius R, Giorgakis E, Viswanath Y, et al. Mortality and Pulmonary Complications in Patients Undergoing Surgery With Perioperative SARS-CoV-2 Infection: An International Cohort Study. The Lancet. 2020.

27. Campanile FC, Podda M, Arezzo A, Botteri E, Sartori A, Guerrieri M, et al. Acute cholecystitis during COVID-19 pandemic: a multisocietary position statement. World journal of emergency surgery : WJES. 2020;15(1):38.

28. Brat GA, Hersey S, Chhabra K, Gupta A, Scott J. Protecting Surgical Teams During the COVID-19 Outbreak: A Narrative Review and Clinical Considerations. Annals of surgery. 2020.

29. Coccolini F, Tartaglia D, Puglisi A, Giordano C, Pistello M, Lodato M, et al. SARS-CoV-2 Is Present in Peritoneal Fluid in COVID-19 Patients. Annals of surgery. 2020;272(3):e240-e2.

30. Mintz Y, Arezzo A, Boni L, Chand M, Brodie R, Fingerhut A. A Low-cost, Safe, and Effective Method for Smoke Evacuation in Laparoscopic Surgery for Suspected Coronavirus Patients. Annals of surgery. 2020;272(1):e7-e8.