A Study on Cases of Gall Bladder Perforation during COVID-19 Pandemic

Priya Gupta, Vineet Chauhan**, Yogeshkumar Baraiya****

Abstract

The novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in Wuhan, China at the end of 2019 and is now a pandemic. Coagulopathy, in the form of venous and arterial thromboembolism can affect the final outcome of disease. This is a retrospective study carried out at Civil Hospital and B.J. Medical College Ahmedabad, on incidence of Gall Bladder Perforation (GBP) from March 2020 to August 2020, during the COVID-19 Pandemic, compared with the incidence in same six months' time period in 2019. Patients of acute cholecystitis presenting to the hospital were studied out of which patients with clinical, radiological and intra-operative diagnosis of gall bladder perforation were included in this study. Parameters such as incidence, duration of illness, risk factors and outcomes were assessed. It was found that during the COVID-19 pandemic, incidence of Gall Bladder Perforation increased.

Keywords : Acalculous cholecystitis, Calculous cholecystitis, COVID-19 pandemic, Gall bladder perforation

Introduction:

The novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in Wuhan, China at the end of 2019 and is now a pandemic.[1] COVID-19 has affected more than 7 million people worldwide and claimed more than 400,000 lives as of June 2020.[2,3] The disease ranges from asymptomatic, or mild to severe illness with multi-organ failure and death.[4-6]

Coagulopathy, in the form of venous and arterial thromboembolism, is emerging as one of the most severe sequelae of the disease, and has been prognostic of poorer outcome.[7-10] The hyper-coagulable state in COVID-19 is emerging as a major pathological occurrence with serious consequences in mortality and morbidity. Clinical manifestations of both widespread microvascular as well as large vessel thrombosis have been recorded. [11]

Gallbladder perforation (GBP) is a rare but life threatening complication of gangrenous gall bladder due to acute acalculous cholecystitis or cholelithiasis. GBP has high morbidity and mortality rates because of delay in diagnosis.[12,13] Thus it still continues to be an important problem for the surgeons and most cases can only be diagnosed during surgery.[12,14] This study is done to find out incidence of gall bladder perforation (GBP) during the COVID-19 pandemic and establish increased incidence of GBP and compare it with incidence 1 year back, during the same time period. It is also done to compare the underlying cause: Cholelithiasis Vs Acalculous Cholecystitis and possibility of COVID-19 infection as a risk factor of gallbladder perforation.

Material and methods:

This retrospective study was conducted with inclusion of 68 patients with acute cholecystitis who presented to our hospital from March 2020 to August 2020 and 61 patients with acute cholecystitis who presented during March 2019 to August 2019. Patients who presented with acute abdominal pain, fever, tenderness and rebound tenderness, were subjected to USG and CT examinations, as well as for laboratory workup for acute abdomen.

* Resident
** Assistant Professor
*** Senior Resident, Department of Surgery, B J Medical College, Civil Hospital, Ahmedabad, Gujarat.
Correspondence : Dr. Priya Gupta
E-mail : drpriya1093@gmail.com

Patients with clinical, radiological and intra-operative diagnosis of gall bladder perforation were included. Patients were initially managed conservatively with antibiotics and i.v. fluids.

Two groups of patients were studied:

Group 1: patients having acute cholecystitis from March 2020 to August 2020.

Group 2: patients having acute cholecystitis from March 2019 to August 2019.

Cases of gall bladder carcinoma and patients younger than 18 years of age were excluded from this study.

Results:

Group 1 - A total of 68 patients of acute cholecystitis were included in the study out of which 12 were diagnosed to have GBP during March 2020- August 2020. The incidence was 17.6%.

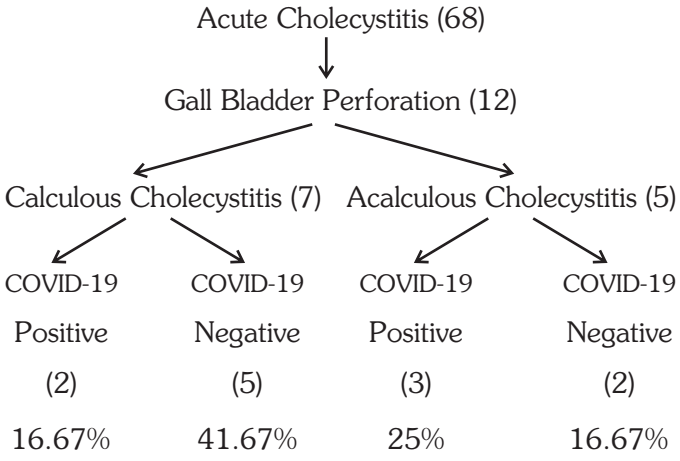
Mean time for patient to present to the hospital after an attack of acute cholecystitis was 20.83 days. Gallbladder perforations were most common in the 5th decade of life. The mean age of patients was 53.2 years. The mean age of patients with calculous and acalculous gall bladder perforation was 57 years and 47.8 years, respectively.

The patients underwent surgery after administration of intravenous crystalloid solutions, and were treated with analgesics and antibiotic (third generation cephalosporins) within the first 36 h (mean 9 h) after admission. The mean hospital stay was 6.7 days (4- 9 days). Three patients underwent laproscopy converted to open cholecystectomy whereas open cholecystectomy was done in 9 patients. A complete cholecystectomy was possible only among 6 patients, whereas subtotal cholecystectomy was performed in rest 6 patients due to dense adhesions in the calots triangle. Out of 12 patients, 2 patients expired due to septicaemia. Bile leak occurred in 2 patients whereas post-operative course was uneventful in 8 patients. The histopathologic analysis in the 12 patients showed acute on chronic calculous cholecystitis in 7 cases and acute gangrenous acalculous cholecystitis in 5 cases. Out of 7 patients of calculous cholecystitis, 2 patients were COVID-19 positive and 5 patients were COVID-19 negative whereas among 5 patients of acalculous cholecystitis, 3 patients were COVID-19 positive and 2 patients were COVID-19 negative.

Table 1: Co-morbidities among study participants (Group-1)

Co-morbidity	No. of patients (%)
Diabetes Mellitus	5 (41.7)
COVID-19	5 (41.7)
Hypertension	2 (16.7)
Liver Parenchymal Disease	1 (8.3)
COPD-Chronic Obstructive Pulmonary Diseases	1 (8.3)
CKD – Chronic Kidney Diseases	1 (8.3)

Group 2 - A total of 61 patients of acute cholecystitis were included in the study out of which 4 were diagnosed to have GBP during March 2019- August 2019. 1 patient was female while 3 were male patients. The incidence was 6.56%. Mean time for patient to present to the hospital after an attack of acute cholecystitis was 5.75 days. The mean age of patients was 59.2 years. Mean age of patients with calculous and acalculous gall bladder perforation was 64.2 years and 54.5 years respectively.

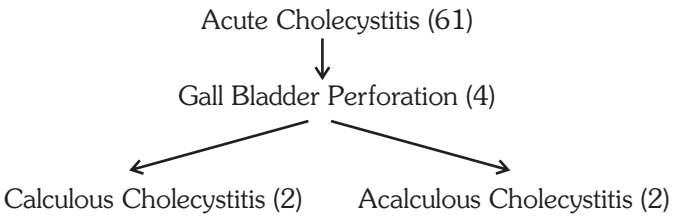


The patients underwent surgery after administration of intravenous crystalloid solutions, and were treated with analgesics and antibiotic (third generation cephalosporins). The mean hospital stay was 5.25 days (3-10 days). One patient underwent laproscopic cholecystectomy whereas open cholecystectomy was done in 3 patients. A complete cholecystectomy was possible among 3 patients, whereas subtotal cholecystectomy was performed in 1 patient due to dense adhesions in the calots triangle. Out of 4 patients, bile leak occurred in 1 patient whereas post-operative course was uneventful in 3 patients. There was no mortality. The histopathologic analysis in the 4 patients showed acute on chronic calculous cholecystitis in 2 cases and acute gangrenous acalculous cholecystitis in 2 cases.

Table 2: Co-morbidities among study participants (Group-2)

Co-morbidity	No. of patients (%)
Diabetes Mellitus	3 (75%)
Hypertension	2 (50%)
Liver Parenchymal Disease	1 (25%)

Discussion:



Mean time to diagnosis GBP was about 5-20 days in study of Huang et al who treated GBP in emergency department;[15] whereas in our study, mean time of presentation to emergency department was 20.8 days. Majority of people owed this delayed presentation to factors such as lack of transportation and fear to approach hospitals during the COVID-19 pandemic. Mean time of presentation during the same time period last year was 5.75 days. Inflammation may progress and cause ischemia and necrosis thus resulting in GBP in 2% to 11% of acute cholecystitis patients.[16-19] In our study, incidence of GBP during the COVID-19 pandemic was 17.6% as compared to 6.56% during the same time period previous year.

Acute uncomplicated cholecystitis is more common among females with a female to male ratio of 2:1.[20] However, GBP is more frequent in male gender.[21,22] In our study, GBP occurred in females (58.3%) more than males (41.7%) during the COVID-19 pandemic. GBP is usually seen over 60 years of age[23,24] whereas mean age of patients with GBP in our study was 53.2 years. Between calculous and acalculous cholecystitis, the overall incidence of gallbladder perforation due to acalculous cholecystitis is higher, reaching approximately 10 to 20% [19] whereas in our study, we observe that incidence of GBP is more in calculous cholecystitis (10.3%) as compared to acalculous cholecystitis (7.35%) during the COVID-19 period. Incidence of GBP was 3.3% in calculous cholecystitis and 3.3% in acalculous cholecystitis during the same time period last year. Three patients underwent laproscopy converted to open cholecystectomy whereas open cholecystectomy was done in 9 patients. A complete cholecystectomy was possible only among 6 patients, whereas subtotal cholecystectomy was performed in rest 6 patients due to dense adhesions in the calots triangle. Out of 12 patients, 2 patients expired due to septicaemia, bile leak occurred in 2 patients (who underwent ERCP-guided stenting in early post-op period) whereas post-operative course was uneventful in 8 patients. Incidence of acalculous GBP in COVID-19 positive patients was 25% as compared to 16.67% in COVID-19 positive patients with calculous gall bladder perforation.

Conclusion:

During the COVID-19 pandemic, incidence of Gall Bladder Perforation has increased. There is a rise of GPB occurring in females, and also decreased mean age. There is delayed presentation of the patient to the

hospital. Also, there is increased incidence of GBP in calculous cholecystitis as compared to acalculous cholecystitis. All these findings can be attributed to COVID-19 being a risk-factor for gall bladder perforation.

References:

1. Zhu H., Wei L., Niu P. Glob Health Res Policy. 2020. The novel coronavirus outbreak in Wuhan, China.
2. World Health Organization Situation Reports 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports.
3. Coronavirus Disease (COVID-19-2019): Cases in the U.S. 2020 5/14/2020 5/14/2020; Available from: https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html.
4. Emami A. Prevalence of underlying diseases in hospitalized patients with COVID-19-19: a systematic review and meta-analysis. Arch Acad Emerg Med. 2020;8(1):e35. doi: 10.22037/aaem.v8i1.600.
5. Yi Y. COVID-19-19: what has been learned and to be learned about the novel coronavirus disease. Int J Biol Sci. 2020:1753–1766.
6. Severe Outcomes Among Patients with Coronavirus Disease 2019 (COVID-19-19) - United States, February 12-March 16, 2020. MMWR Morb Mortal Wkly Rep. 2020;69(12):343–346.
7. Zhou F. Clinical course and risk factors for mortality of adult inpatients with COVID-19-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020;395 (10229) : 1054–1062.
8. Guan W.J. Clinical characteristics of coronavirus disease 2019 in China. N. Engl. J. Med. 2020;382(18):1708–1720. doi: 10.1056/NEJMoa2002032.
9. Huang C. Clinical features of patients infected with 2019 novel coronavirus in Wuhan. China. Lancet. 2020; 395(10223): 497–506.
10. Tang N. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. J. Thromb. Haemost. 2020;18(4):844–847.
11. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7305763/
12. Roslyn JJ, Thompson JE, Darvin H, DenBesten L. Risk factors for gallbladder perforation. Am J Gastroenterol. 1987;82:636–640.
13. Lennon F, Green WE. Perforation of the gallbladder. A review of 32 cases. J R Coll Surg Edinb. 1983;28:169–173.
14. Ong CL, Wong TH, Rauff A. Acute gall bladder perforation--a dilemma in early diagnosis. Gut. 1991;32:956–958.
15. C.C. Huang, H.C. Lo, Y.M. Tzeng, H.H. Huang, J.D. Chen, W.F. Kao, et al. Percutaneous transhepatic gall bladder drainage: a better initial therapeutic choice for patients with gall bladder perforation in the emergency department. Emerg Med J, 24 (12) (2007), pp. 836-840.
16. Bedirli A, Sakrak O, Sözüer EM, Kerek M, Güler I. Factors effecting the complications in the natural history of acute cholecystitis. Hepatogastroenterology. 2001;48:1275–1278.
17. Abu-Dalu J, Urca I. Acute cholecystitis with perforation into the peritoneal cavity. Arch Surg. 1971;102:108–110.
18. Menakuru SR, Kaman L, Behera A, Singh R, Katariya RN. Current management of gall bladder perforations. ANZ J Surg. 2004;74:843–846.
19. Ryu JK, Ryu KH, Kim KH. Clinical features of acute acalculous cholecystitis. J Clin Gastrotenterol. 2003;36:166–169.
20. Glenn F. Acute cholecystitis. Surg Gynecol Obstet. 1976;143:56–60.
21. Roslyn JJ, Thompson JE, Darvin H, DenBesten L. Risk factors for gallbladder perforation. Am J Gastroenterol. 1987;82:636–640.
22. Bedirli A, Sakrak O, Sözüer EM, Kerek M, Güler I. Factors effecting the complications in the natural history of acute cholecystitis. Hepatogastroenterology. 2001; 48:1275–1278.
23. Ong CL, Wong TH, Rauff A. Acute gall bladder perforation--a dilemma in early diagnosis. Gut. 1991;32:956–958.
24. Williams NF, Scobie TK. Perforation of the gallbladder: analysis of 19 cases. Can Med Assoc J. 1976;115:1223–1225.