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CASE REPORT

Management of Empyema Gallbladder During COVID-19 Pandemic

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ABSTRACT

Cholecystostomy is performed in high-risk patients with gall bladder disease. These patients are generally elderly with multiple comorbidities; in particular cardiac patients with uncontrolled diabetes, and present late with acute cholecystitis with systemic inflammation. The management of such high-risk patients requires multi-departmental approach. COVID-19 pandemic has widely affected the management guidelines including timing of surgery, extent of pre-operative optimization, use of laparoscopy for surgery and intensive care requirement. We report a case of elderly hypertensive and diabetic patient who presented during the first wave of COVID-19 pandemic with fever, vomiting and pain abdomen. He was diagnosed with empyema gallbladder. Cholecystostomy was performed as a temporizing measure which was followed by elective laparoscopic cholecystectomy as daycare admission. This averted the need for possible intensive care stay and emergency surgery whereas providing equally good outcome.

Keywords: Laparoscopic Cholecystectomy, Empyema, Gallbladder, Cholecystostomy, Cholelithiasis

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Introduction

During the first wave of COVID-19 pandemic in Pakistan, there was an overflow of patients in outpatient departments and emergencies as well as shortage of beds in high dependency and intensive care units. Moreover COVID-19 pandemic has made doctors to change management plans depending upon individual cases and available resources. Empyema gallbladder is an emergency and needs intervention at earliest. Gallstone impacted at neck is the common the cause of Empyema gallbladder. In high-risk patients, the decision regarding management of gallstone disease can vary i.e., conservative management, surgery (open or laparoscopic), interval cholecystectomy, cholecystostomy, etc. Cholecystostomy is a relatively safe and efficient temporizing measure in the treatment of acute gallstone related disease (cholecystitis, empyema, etc.) in high-risk patients averting the need for anesthesia and emergency surgery.[1,2] These high-risk patients include those who are not suitable for immediate Laparoscopic Cholecystectomy (LC) such as elderly, severely septic patients, those admitted with shock, having poor physiologic reserve or the ones in intensive care unit.[3] Percutaneous cholecystostomy (PC) is performed usually by interventional radiologist using transhepatic or transperitoneal route under local anesthesia. [4] Many Western countries suggest that PC could be used as an alternative for cholecystectomy in patients with severe comorbidities or those unfit for surgery.[5,6] The risks associated with PC in high-risk patients are minimal with postoperative morality ranging from 10 to 12% as compared to LC ranging from 5 to 30%. [7,8] These include blood loss, tube dislodgement, blockage,

bile leakage, organ perforation etc.[9,10] Once cholecystostomy is performed, the patient can be optimized for elective LC that is performed usually after 6 to 8 weeks. This also allows the patient to recover from acute illness.[11] PC catheter can be removed prior to or during the surgery. [2] We present a case of a patient who presented in early COVID-19 pandemic wave with empyema gallbladder and was initially managed with PC in acute phase followed by elective LC.

Case Presentation

A 65-year-old retired male officer, belonging to a middle-class family residing in Islamabad, presented with pain right hypochondrium that radiated to back and right shoulder, fever with chills and rigors and vomiting that was non-bilious for one day. He was a known case of hypertension and uncontrolled diabetes. Family history was unremarkable. Patient had no allergies, addictions and any surgical history. On examination, he was found to have tachycardia, fever of 99.5^0F and dehydration. Abdominal examination showed mild guarding in right upper quadrant. Liver function tests (LFTs) and serum amylase were normal while C-reactive proteins (CRP) levels were high. Ultrasound showed overdistended gallbladder (110mmx60mm) with wall thickness of 10mm, a stone 10.9mm impacted at neck of gallbladder, debris in gallbladder and pericholecystic fluid. Common bile duct was normal (4.1mm). D Dimers, International Normalized Ratio and HbA1c were raised. Severe Acute Respiratory Syndrome corona virus 2 (SARS-CoV2) was negative. Computerized Tomographic (CT) Scan was performed that showed pericholecystic fluid/collection and stone impacted at neck of gallbladder as shown in Figure 1 and Figure 2.

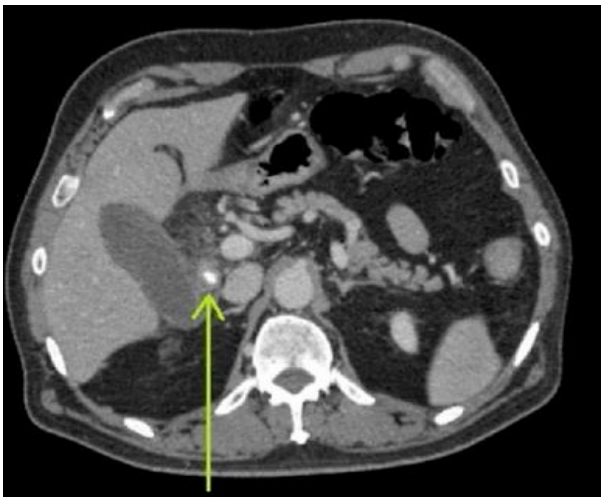

Figure 1: Gallstone impacted at neck of Gallbladder

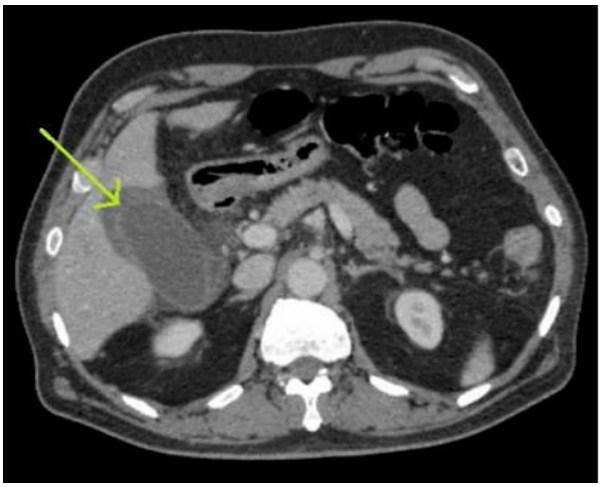

Figure 2: Pericholecystic Fluid/Collection

The diagnosis of empyema gallbladder with contained perforation was made and emergency laparoscopic cholecystectomy was planned. Anesthetist considered the patient to be high risk and wanted to confirm availability of bed in High dependency unit (HDU) or Intensive care unit (ICU) after the surgery. Due to COVID-19 Pandemic, all the hospitals were overwhelmed by influx of COVID-19 patients. There was overcrowding of HDUs and ICUs in hospitals all over the country. Bed availability could not be confirmed nor transfer the patient in such situation to another hospital was possible. On second day, tenderness and guarding persisted in right upper quadrant. CRP levels and D Dimers further increased. Antibiotics were upgraded. Patient was discussed in multidisciplinary team meeting. It was decided that cholecystostomy

should be performed considering the high-risk case and non-availability of HDU or ICU. Image guided cholecystostomy was performed by Interventional Radiologist. Next day, patient's clinical parameters improved alongside decreased tenderness. Patient had fever spike of 99.5^0 F. CRP and D Dimers started decreasing after 36 hours. Patient was discharged after 48hours on injectable antibiotics as per culture report.

Six weeks later elective laparoscopic cholecystectomy was performed with optimized glycemic control and hypertension. Patient was discharged, as daycare procedure, in evening. He came for first follow up after 3 days where he had no active complaints except for mild pain on exertion. He was started on regular diet and basic routine activities. On 10^{th} post operative day, stitches were removed and a video session of the laparoscopic procedure was done with the patient. The patient then started all his routine activities and diet without any restrictions from surgical team.

Table I: Laboratory Parameters				Normal Values
Liver Function Tests		Bilirubin	0.29 mg/dL	0.2 to 1.3
		Aspartate Aminotransferase	21 U/L	0 to 41
		Alanine Transaminase	18 U/L	0 to 41
		Alkaline Phosphatase	73 U/L	30 to 115
C-Reactive Protein (High Sensitive)	Day 1	279mg/L		<1.0mg/L Low risk 1.0 mg/L to 3.0mg/L Average Risk 3.0mg/L to 10mg/L High risk >10 Acute inflammation
	Day 2	516.1 mg/L		
	Day 3	226.8 mg/L		
D Dimers	Day 1	1853ng/mL		<500 Negative
	Day 2	15456ng/mL		>500 Positive
	Day 3	8994ng/mL		
Serum Amylase		43 U/L		28 to 100
International Normalized Ratio		1.61		0.8 to 1.2
Prothrombin Time		21 Seconds		9 to 14
HbA1c		9.2%		4.8 to 6.4

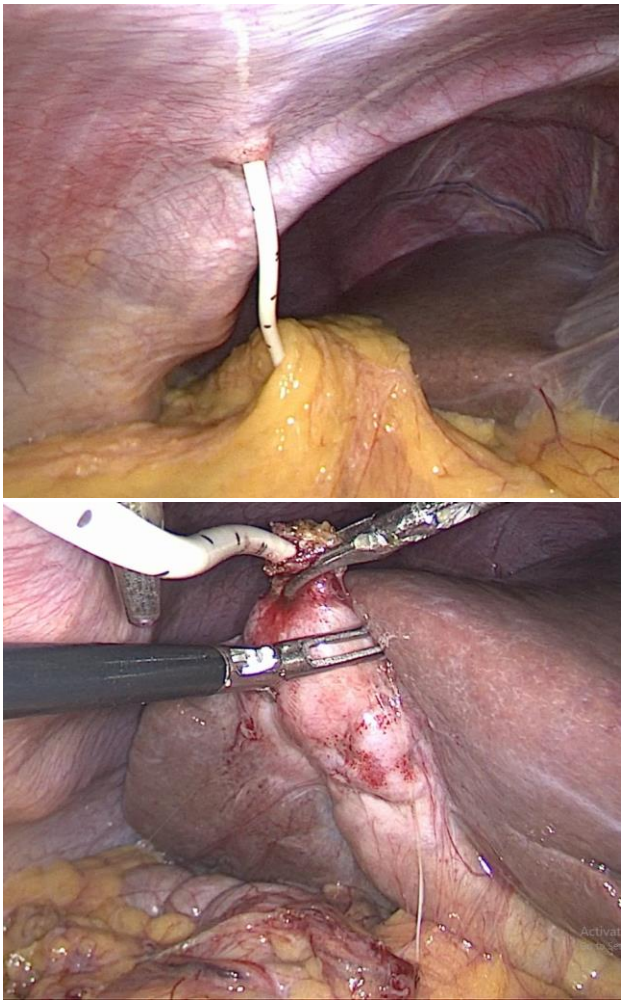

Figure 3: Peroperative images of cholecystostomy and drain.

Discussion

LC can be done as emergency procedure, early or interval LC. The treatment may vary from one individual to another depending upon different

parameters that include age, acute presentation and presence of comorbid conditions like hypertension, diabetes, ischemic heart disease, active COVID-19 infection, sepsis, etc. LC in such high-risk patients can lead to increased risk of conversion to open surgery, per operative complications and longer duration of hospital stay with need for HDU/ICU. [12] In patients where the risks of morbidity and mortality outweigh the standard LC, percutaneous cholecystostomy is a safe alternative to resolve the active disease process.[1,2,9] PC aids in averting the emergency situation thereby decreasing the risks of perioperative complications and planning for definitive surgery later on after optimization. [8] However patient needs to be readmitted and planned for surgery after 6 to 8 weeks. [2] There is no standardization regarding the timing of interval cholecystectomy after PC. There is no consensus on whether the catheter is to be removed during the definitive surgery or earlier. There are many who consider PC as the definitive treatment for high-risk patients.[3] PC adds to medical expenses due to readmission later on for definitive surgery and removal of catheter. There is also associated risk of tube dislodgement, bleeding, tube site infection, local discomfort, tube blockage, cholangitis, etc. [1] Challenges may be faced while performing PC in patients with deranged coagulation profile, those who have gallbladder full of stones, cirrhotic liver, ascites, phlegmon, etc. Due to COVID-19 pandemic, all hospitals were overcrowded especially the high dependency units and intensive care units. There was lack of oxygen supply, availability of ventilators, guidelines about laparoscopic and open surgeries in emergency setting and human resources. In such cases, one has to consider the optimum management plan for the patient and use multidisciplinary approach.

Conclusion

Percutaneous cholecystostomy helped in avoiding risks associated with emergency surgery in this high-risk patient. Interval laparoscopic cholecystectomy performed later as definitive procedure improved outcomes in terms of morbidity and mortality. Considering non availability of high dependency units and intensive care units during the first wave of COVID-19 pandemic, this management plan helped in converting an emergency procedure to an elective planned procedure.

Randomized control trials should be done to establish guidelines regarding when to perform PC, when to remove the catheter and what is the optimum timing for definitive surgery.

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