REVIEW ARTICLE

Cholecystectomy for Acute Cholecystitis: wait or operate?

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Abstract:
Gallstone disease is one of the most common problems in general surgery. Acute cholecystitis due to gallstones is a common cause of acute abdominal pain requiring surgical treatment. The timing of surgery has largely been controversial. There are proponents and opponents for both early and delayed cholecystectomy, while laparoscopic cholecystectomy (LC) remains the standard of care for both types of treatment. Early surgery is performed during the initial (index) hospital admission as the patient presents with symptoms of acute cholecystitis. The concept of operating the patient early is that the tissues are edematous and inflammatory edema makes dissection of tissues easier. Decreased hospital time, reduced treatment costs, and early return to work also make up the plus points of early cholecystectomy. On the other hand, opponents of early surgery regard it as a formidable under-taking to operate the patient in inflamed, bleeding and adherent tissues that are prone to misidentification and iatrogenic injury. Traditionally, delayed surgery is performed electively several weeks after the patient's symptoms and signs have resolved on conservative treatment and inflammation has settled. Resolution of acute inflammation, edema and adhesions is regarded to make dissection clearer, easier and safer. This makes interval cholecystectomy yet another attractive approach for cholecystectomy for acute cholecystitis.

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Abbreviations: CHT: Cholecysto-hepatic triangle, LC: Laparoscopic cholecystectomy, PCC: Percutaneous cholecystostomy

Introduction:

Although acute calculous cholecystitis is a commonly encountered condition, the timing of operating on acute cholecystitis is significantly controversial and the debate has been going on for more than two decades.[1] Two schools of thought exist for treating acute cholecystitis. Early or index admission cholecystectomy is performed within 24-72 hours of onset of symptoms or in the same admission for acute cholecystitis. Delayed (interval) cholecystectomy is performed after initially treating the acute illness conservativelyand allowing 8-12 weeks for complete resolution of inflammation.[2,3] Both approaches have their own risks and benefits. In the acute setting, surgery is performed on inflamed and edematous tissues. The inflammatory edema facilitates dissection by opening up plains.[1] On the other hand, operating on acutely inflamed, adherent and bleeding tissues that are fused together may prove to be a difficult and complex task, putting the patient at risk of biliary and vascular injuries due to misperception and misidentification of structures in and around cholecysto-hepatic (or Calot's) triangle(CHT).[4] On the contrary, delaying surgeryfor a few weeks allows time for inflammation to settle, making anatomic clearance and visualization of

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structures easier. This should, at least theoretically, reduce the chances of mis-identification of structures during dissection in the cholecysto-hepatic triangle. However, inflammation may resolve leaving behind adherent, scarred and fused tissues. This again makes dissection difficult and puts the patient at risk of iatrogenic injuries. Besides, this approach also renders the patient prone to other gallstone-related complications in the interim period before undergoing elective cholecystectomy and the patient may not be completely symptom-free during this time period.[3] Enormous data exists on this subject. We shall briefly review the pros and cons of each approach based on evidence and try to build a consensus on the approach that is more favored and more beneficial for the patient.

Discussion:

Gallstones affect around 10-15% of the population, more commonly affecting its female gender. Out of these, roughly 20% will become symptomatic in 20 years' time. The incidence increases with the aging population requiring cholecystectomy. Largely asymptomatic, they can become symptomatic in 10-15% of individuals causing biliary colic, acute or chronic cholecystitis, acute pancreatitis and choledocholithiasis.[5,6]

Pathologically, acute calculous cholecystitis starts from cystic duct obstruction due to gallstones leading to an acute inflammatory cascade. Obstruction of the duct leads to collection of bile and mucus in the gallbladder lumen causing its distension, compression of blood vessels inits walls and edema of the walls. Left untreated, the edematous phase is followed by mucosal erosions, sub-mucosal hemorrhages and necrosis of the gallbladder wall. This necrotizing stage is followed by suppuration of the pent-up bile and mucus leading eventually to abscess (empyema) formation, perforation or fistulationinto adjacent viscera.[7] The inflammatory process does not remain limited to the gallbladder wall, but may spread to involve structures in and around the cholecysto-hepatic triangle, duodenum, colon and omentum leading to inflammatory adhesions which may sometimes be severe enough to pullup distant structures like appendix to the gallbladder.[8] Although extensive efforts have been made to mitigate biliary injuries during laparoscopic cholecystectomy but they are still not uncommon. Such injuries result from miss identification of ducts due to severe inflammation and abnormal anatomy or from technical errors due to inexperience.[9] Severe inflammation obliterates the cholecysto-hepatic triangle, masking the cystic duct and other ductal structures in the triangle so that the critical view of safety cannot be achieved. The gallbladder may become fused with the bile ducts making them prone to injury. Similarly, the common bile duct or an aberrant right hepatic duct may be mistaken for the cystic duct. Fundus-first or 'dome-down' approach in such situations can also lead to serious vascular or biliary injury.[4,10,11] Technically, laparoscopic cholecystectomy (LC) has been the standard of care for symptomatic gallstones as well asfor acute or chronic calculous cholecystitis. The traditional treatment of acute cholecystitis has been to conservatively manage the condition, unless complicated, and let inflammation cool down for a few weeks before performing cholecystectomy on elective basis. A large volume of literature including randomized controlled trials and meta-analyses exists comparing early and delayed LC. Some trials describe a clear superiority of early cholecystectomy while others see no difference in the outcome of either approach but both prefer early laparoscopic cholecystectomy due to shorter hospital stay and lower costs of treatment.[12] On the other hand, there are authors favoring conservative treatment initially. According to them, acute cholecystitis may not necessarily be followed by symptomatic course prone to complications of gallstones and conservative management may be sufficient treatment for some patients who have suffered uncomplicated acute cholecystitis.[13,14] But conservative management does have its own short-comings. During the delay period of conservative treatment, the patient can have occasional or persistent biliary colic and repeat attack(s) of acute cholecystitis that may be worse than the initial episode. Cholangitis, acute pancreatitis and choledocholithiasis may also occur during the interim period.[15]

Besides physical consequences, delayed surgery also has psychological, financial and social impact that adversely affects the patient's quality of life.[16] But conservative treatment or delayed cholecystectomy is a feasible option for patients with cholecystitis who have undergone radiotherapy for abdominal malignancy.[17] On the other hand, early cholecystectomy has its own benefits despite a higher conversion rate. It may be performed within 24-72 of admission while the patient may have remained symptomatic for 3-5 days before cholecystectomy.[18,19] Tokyo Guidelines 13 recommend early cholecystectomy in grade I (mild cholecystitis) and delayed cholecystectomy in grade II (moderate cholecystitis). But this approach has been challenged by several authors who claim to safely perform early cholecystectomy in grade II and even in grade III acute cholecystitis.[20-22] According to some authors, early cholecystectomy may also be a safe option in patients with renal failure on hemodialysis.[23] Early laparoscopic cholecystectomy is also performed for cholecystitis during all trimesters of pregnancy as well as in patients over 65 years of age with superior outcomes as compared to initial conservative treatment.[24]

Not all patient's may be candidates for early surgery. High risk patients with severe acute cholecystitisand deteriorating clinical condition despite medical treatment, gallbladder abscess, patients with coagulopathy or thrombocytopenia and those severely ill patients with comorbidities (coronary artery disease, chronic renal failure, sepsis on admission) who are not fit for immediate surgery may benefit from initial percutaneous cholecystostomy (PCC), percutaneous transhepatic gallbladder drainage and several endoscopic gallbladder drainage procedures to resolve the acute infection.[25] This may be followed by elective laparoscopic cholecystectomy. Such patients may not be candidates for total cholecystectomy due to operative difficulties because of inflammatory scarring and end up in subtotal cholecystectomy as a bail-out procedure.[26-29] One must be cautious about cholecystectomy after percutaneous cholecystostomy in high risk patients due to the associated comorbidities and old age as a large number of patients may remain asymptomatic following percutaneous cholecystostomy.[30] Patients who undergo percutaneous cholecystostomy followed by delayed cholecystectomy tend to have a difficult operation with higher conversion rates, prolonged hospital stay, biliary and wound related complications requiring repeated admissions.[31] In severe cholecystitis with a duration of 3-days or more and ultrasound findings of wall-thickness of >5mm, pericholecystic fluid or abscess formation, laparoscopic cholecystectomy can be technically challenging and may require cholecystostomy or conversion to open surgery as a bailout procedure.[32] Emergency laparoscopic cholecystectomy for acute cholecystitis within 24 hours of admission is now routine practice in many centers, especially in the USA. Some even perform bile duct exploration during emergency cholecystectomy.[33-35] Although the superiority of any method of treatment is not definitively proven and debate is still ongoing as to which approach to adopt as a principle of treatment, yet a large volume of data suggests a tilt of balance toward immediate or early cholecystectomy within 24 hours.[36] Surgical intervention for acute calculous cholecystitis can be performed in three phases. The safest is to operate before inflammation has started or when it has settled. During the initial phase of inflammation, the tissues are edematous and easily bleed, obscuring the anatomical details but it is still regarded as a safe period. This early phase is followed by an interim protracted phase of tissue adhesion, fibrosis and scarring spanning over several weeks, making identification of anatomy difficult due to structural distortion. This is that dangerous phase where iatrogenic injuries are likely to occur and surgery must be avoided.[37,38]

Conclusion:

The timing of treating patients with acute calculous cholecystitis is a long-standing debate. Although the literature has more support for the early cholecystectomy dogma, the mere fact that the subject is still under debate is sufficient evidence that a definite, one-for-all approach has yet to be agreed upon. It seems that a particular treatment option between early and delayed

cholecystectomy needs to be individualized according to the clinical presentation of the patient and the existing circumstances surrounding the patient. Patients with mild, early symptoms and those deteriorating on or not responding to the initial conservative treatment must undergo index admission cholecystectomy. Treatment for other patients must be individualized according to the standards of care followed in that particular center. This may be early

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Zafar Ullah Khan, collected the data, did the research and wrote the article.

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