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Research Article

**EVALUATION OF EARLY VERSUS DELAYED
LAPAROSCOPIC CHOLECYSTECTOMY IN MANAGEMENT
OF ACUTE CHOLECYSTITIS**

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Abstract**Background**

Acute cholecystitis is a common emergency presentation with the incidence of acute cholecystitis being similar to the incidence of acute appendicitis. Laparoscopic cholecystectomy has become an important approach for treating acute cholecystitis overtime and it has now replaced open cholecystectomy as the first choice of treatment for acute cholecystitis. However, the optimal timing of laparoscopic cholecystectomy remains controversial. Therefore, the main objective in this study is to review the recent literature compared the outcomes of early versus delayed laparoscopic cholecystectomy.

Objective

A lot of literatures have been done in order to provide patients with acute cholecystitis a better outcomes, in our review we will evaluate the recent publications assessment of the optimal time for laparoscopic cholecystectomy.

Method

PubMed database were used for articles selection. All relevant articles related to our review were chosen to cover the following topics: Acute cholecystitis, Management, Early and Delayed Laparoscopic Cholecystectomy. We excluded other articles, which are not related to our objectives. The data have been extracted according to specific form to be reviewed by the authors

Conclusion

According to the recent evidence, early laparoscopic cholecystectomy is recommended to be the standard treatment option in treating acute cholecystitis. Delaying the operation did not show any value regarding outcomes and in some studies, it was associated with more complications, cost, and troublesome. Therefore, performing the surgery as early as possible is the preferable choice. Even for elderly patients with acute gallbladder disease, early laparoscopic cholecystectomy proved to be safe and effective. In patients with acute gallstone pancreatitis, early laparoscopic cholecystectomy was found to be reducing the risk of recurrent biliary events without an increase in operative difficulty or perioperative morbidity.

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INTRODUCTION:

Gallstone disease is prevalent in 10% of the population, and up to 23% can develop into acute cholecystitis [1,2]. Gallstones are hardened deposits of the digestive fluid bile that can form within the gallbladder. They vary in size and shape from as small as a grain of sand to as large as a golf ball. Gallstones occur when there is an imbalance in the chemical constituents of bile that result in precipitation of one or more of the components. Gallstone formation itself depends on several risk factors. In the general population, several risk factors for gallstone formation are known to increase with age with a cut-off of 40 years, female gender, obesity, and rapid weight loss as the most important contributors [3,4,5]. Acute cholecystitis is a common emergency presentation with the incidence of acute cholecystitis being similar to the incidence of acute appendicitis. It is a potentially life-threatening complication, which affects more than 20 million Americans annually and leads to direct costs of over US \$6,3 billion [6].

Since Mouret introduced laparoscopic cholecystectomy in 1987, it has become an important approach for treating acute cholecystitis nowadays [7]. Issued data indicated that approximately 917,000 laparoscopic cholecystectomies were annually performed to treat acute cholecystitis in the United States [8]. It has now replaced open cholecystectomy as the first choice of treatment for gallstones and inflammation of the gallbladder unless contraindications are found with the laparoscopic approach [9]. With time, the complication rate associated with laparoscopic cholecystectomy has

become lower due to the development in laparoscopic skill and equipment [10]. Nevertheless, the optimal timing of laparoscopic cholecystectomy remains controversial and under debate, whether it should be performed early or after a specific period of time. Therefore, we aim in this paper to review the recent articles published regarding this issue.

METHODOLOGY:

Sample

We performed comprehensive search using biomedical databases; Medline, and Pubmed, for studies concerned with assessment of optimal time for Laparoscopic Cholecystectomy published in English language. Keywords used in our search through the databases were as {Acute cholecystitis, Management, Early and Delayed Laparoscopic Cholecystectomy} More relevant articles were recruited from references lists scanning of each included study.

Analysis

No software was used, the data were extracted based on specific form that contain (Title of the study, name of the author, Objective, Summary, Results, and Outcomes). Double revision of each author outcomes was applied to ensure the validity and minimize the errors.

RESULTS:

A total of 9 articles were enrolled in our study according to our inclusion criteria. The studies details are included within **Table1**.

Table 1: the included studies.

Study	Year	Design	Country	Objective	Number of Participants	Conclusion and Outcomes
Rajcok M et al. (11)	2016	Prospective randomized trial	Slovakia	To compare early versus delayed laparoscopic cholecystectomy in treatment of acute cholecystitis.	62	Immediate laparoscopic cholecystectomy should become a preferred method of treatment of the patients with acute cholecystitis.
De Mestral et al. (12)	2014	Population-based retrospective cohort	Canada	To compare the operative outcomes of early and delayed cholecystectomy for acute cholecystitis.	14,220	These results support the benefit of early over delayed cholecystectomy for patients with acute cholecystitis.

Ozkardes et al. (13)	2014	prospective, randomized, 2-arm clinical study	Turkey	To compare the clinical outcome and cost of early versus delayed laparoscopic cholecystectomy for acute cholecystitis.	60	Early laparoscopic cholecystectomy should be preferred for treatment of acute cholecystitis because of its advantages of shorter hospital stay and lower cost.
Bouassida et al. (14)	2015	Retrospective	Tunisia	To compare the clinical outcome and cost of immediate (patients undergoing laparoscopic cholecystectomy within 24 h following symptom onset) versus early laparoscopic cholecystectomy (patients managed 25-72 h following symptom onset) for acute cholecystitis.	493	Laparoscopic cholecystectomy, for acute cholecystitis, during the first 24 h of onset of symptoms, significantly reduced conversion to open surgery and total hospital stay without increasing postoperative complications.
Yuval et al. (15)	2017	Retrospective	Israel	To evaluate the advantages and limitations of delayed laparoscopic cholecystectomy in a tertiary center.	1078	Delayed laparoscopic cholecystectomy is associated with significant loss of follow-up, long length of stay, and higher than expected use of percutaneous cholecystectomy. Conversion rates are lower than in the literature while rates of bile duct injury and mortality are comparable.
Acar et al. (16)	2017	Retrospective	Turkey	To compare the outcomes of early versus late cholecystectomy in patients with acute cholecystitis.	66	Early cholecystectomy is known to significantly reduce the costs in patients with acute cholecystitis.
Shinke et al. (17)	2015	Retrospective	Japan	To clarify the feasibility and safety of late phase urgent laparoscopic cholecystectomy in acute cholecystitis.	233	Late phase urgent laparoscopic cholecystectomy (4–7 days after symptom onset) for acute cholecystitis was feasible and safe.

S.L. Jee et al. (18)	2016	Open-label, prospective randomized controlled study	Malaysia	To compare the outcomes of early Versus delayed cholecystectomy in patients with acute biliary pancreatitis.	72	In mild to moderate acute biliary pancreatitis, early laparoscopic cholecystectomy reduces the risk of recurrent biliary events without an increase in operative difficulty or perioperative morbidity.
H.H. Al-Qahtani (19)	2014	Retrospective	Saudi Arabia	To study the safety of early cholecystectomy during the index admission following acute mild gallstone pancreatitis.	386	Early cholecystectomy following acute mild gallstone pancreatitis was found to be a safe procedure when performed during the index admission. It resulted in significant reduction in the hospital stay as well as in the recurrent gallstone related events.

DISCUSSION:

The common plan in treating acute cholecystitis traditionally was the delayed laparoscopic cholecystectomy at least 1 week after initial conservative treatment with antibiotics and anti-inflammatories. It has been thought that early surgery will be associated with higher rate of complications like leakage and bile duct injury. This was suggested to be probably due to fragility of tissue during the acute phase of the inflammation. So, conservative treatment was suggested to be done during what is called cool down period. However, several papers have been published recently comparing early and delayed laparoscopic cholecystectomy. These studies found that early laparoscopic cholecystectomy is more preferable and favorable to be done [11,12,13,14,15,16]. According to the recent literature, this delay did not show any difference [20]. The complication rate was similar and comparable in many studies and in other studies like (Rajcok et al.) [11], early treatment had the complete advantage over delayed approach. It was associated with shorter operation time, and lower conversion to open rate. In addition, patient satisfaction was higher among who were treated early. This is because bearing pain and other unpleasant symptoms associated with acute cholecystitis for long period of time that can reach 4 to 6 weeks is unfavorable. In addition, early surgery is considered a cost-effective approach compared to

delayed intervention in which, early operation was associated with shorter length of hospital stay, shorter postoperative convalescence and lower cost of hospitalization as were found in all the studies. So, if there is no clear benefit found, delayed cholecystectomy should be avoided.

In (Yuval et al.) [15] study, percutaneous cholecystostomy was used during the cool down period. Nearly a quarter of the patients (24%) required the insertion of percutaneous cholecystostomy. It is reserved as a salvage procedure in patients too moribund or too terminally ill to undergo cholecystectomy or in patients in which conservative treatment with antibiotics has failed. It is done by placing a catheter percutaneous in the gallbladder lumen under imaging guidance in order to provide a potential route for stone dissolution therapy and stone extraction [21]. While waiting for surgery, a significant minority was readmitted with percutaneous cholecystostomy tube complications. Percutaneous cholecystostomy was associated with increased perioperative complications including bile duct injury, bleeding, surgical site infection, longer hospitalization and more readmissions. It has been recognized as a definitive procedure for acute cholecystitis in a selective group of old. However, even though elderly patients are more likely to present with several co-morbidities in advanced stages, early laparoscopic cholecystectomy for

elderly patients with acute gallbladder disease proved to be safe and effective, and should be regarded as the standard of care, with the condition of an appropriate selection of the cases in this patient population [22,23].

Other studies assessed the role of early laparoscopic cholecystectomy on conditions other than acute cholecystitis such as acute gallstone pancreatitis. Acute gallstone pancreatitis is often self-limited. However, it can be associated with significant morbidity and even mortality. So, the treatment plan of acute gallstone pancreatitis starts with clearance of common bile duct from gallstones by Endoscopic Retrograde Cholangio-Pancreatography (ERCP). Then, scheduling a cholecystectomy after the local and systemic manifestations resolve is the next step. To achieve this, cholecystectomy is recommended to be delayed especially in severe pancreatitis [24,25]. Nevertheless, the optimal time for cholecystectomy is still controversial in cases of mild pancreatitis. Therefore, (Al-Qahtani) [19] conducted a study discussing this idea. He found that early laparoscopic cholecystectomy for patients with acute mild gallstone pancreatitis was found to be a safe procedure when performed during the index admission. There was no significant increase in conversion rate or bile duct injuries. It also resulted in significant reduction in the length of hospital stay as well as in the recurrent bilio-pancreatic gallstone related events. Similar to (Al-Qahtani) [19] paper, (Jee et al.) [18] also found that early laparoscopic cholecystectomy in acute biliary pancreatitis patients reduces the risk of recurrent biliary events without an increase in operative difficulty or perioperative morbidity.

The definition used for early phase was unclear because timing of surgery was expressed relative to differing events, such as symptom onset, initiation of conservative treatment and time of admission. Therefore, (Bouassida et al.) [14] compared the outcomes of patients undergoing laparoscopic cholecystectomy within 24 hours of symptom onset with patients managed 25 to 72 hours after symptoms onset for acute cholecystitis. They found that immediate laparoscopic cholecystectomy (within the first 24 hours) significantly reduced total hospital stay without increasing intra- and postoperative complications. They also found that the conversion to open rate was significantly lower in the group of patients those operated immediately within the first

24 hours. In addition, gangrenous cholecystitis was significantly less frequent in the same group. (Bouassida et al.) [14] related this to the progression of local inflammation that occurs in the gallbladder over several days of delay which led to gallbladder wall hardening, loss of normal layered architecture and edema in the surrounding structures. However, there were no significant differences in the morbidity rates between the two groups. (Shinke et al.) [17] assessed the late phase of early laparoscopic cholecystectomy (4–7 days after symptom onset) and tried to clarify its feasibility and safety. They found that performing urgent laparoscopic cholecystectomy in the late phase was feasible and safe in acute cholecystitis patients. However, it did not influence operation time, postoperative complications, or postoperative hospital stay. Nonetheless, blood loss was greater and conversion to open surgery was more frequent in the late phase group compared with the early phase group. Similar to (Bouassida et al.) [14], (Shinke et al.) [17] related these complications to the progression of the inflammation over time, as explained earlier. Therefore, performing the surgery as early as possible is the preferable choice.

CONCLUSION:

According to the recent evidence, early laparoscopic cholecystectomy is recommended to be the standard treatment option in treating acute cholecystitis. Delaying the operation did not show any value regarding outcomes and in some studies, it was associated with more complications, cost, and troublesome. Therefore, performing the surgery as early as possible is the preferable choice. Even for elderly patients with acute gallbladder disease, early laparoscopic cholecystectomy proved to be safe and effective. In patients with acute gallstone pancreatitis, early laparoscopic cholecystectomy was found to be reducing the risk of recurrent biliary events without an increase in operative difficulty or perioperative morbidity.

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