A Comparative Study Between Early Versus Delayed Laparoscopic Cholecystectomy in Cases of Acute Calcular Cholecystitis

Thesis

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Mahmoud Mohamed Galal Yassin El-Shazly

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List of Abbreviations

Abb.	Full term

AC .....*Acute cholecystitis*
ACC .....*Acute calculus cholecystitis*
CA.....*Communicating Arcade*
CBD .....*Common bile duct*
CD ..... *Cystic duct*
CHA.....*Common hepatic artery*
CHD .....*Common hepatic duct*
ELC .....*Early Laparoscopic cholecystectomy*
GDA.....*Gastroduodenal artery*
HIDA.....*Hydroxyiminodiacetic acid*
LC .....*Laparoscopic cholecystectomy*
LHA ..... *Left hepatic artery*
LHD .....*Left hepatic duct*
OC .....*Open cholecystectomy*
PD ..... *Pancreatic duct*
PSPDA .....*Posterior superior pancreaticoduodenal artery*
RASA.....*Right anterior sectoral artery*
RASD .....*Right anterior sectoral duct*
RHA.....*Right hepatic artery*
RHD .....*Right hepatic duct*
RPSD ..... *Right posterior sectoral duct*
SILS.....*Single incision laparoscopic surgery*
SMV ..... *Superior mesenteric vein*
SSLC.....*Single site laparoscopic cholecystectomy*
SV ..... *Splenic vein*

Abstract

Acute cholecystitis (AC) is one of the important causes of abdominal pain on presentation to the emergency department. Early diagnosis and treatment of AC has a positive effect on morbidity and mortality.

Laparoscopic cholecystectomy (LC) is an important approach for treating acute cholecystitis nowadays. Issued data indicated that approximately 917,000 and >50,000 LCs were annually performed to treat acute cholecystitis in the United States and England, respectively. Although LCs have been extensively performed to manage acute cholecystitis, the optimal timing of LC for this given condition is inconclusive.

Patients and methods: From December 2018 to July 2019 in Ain Shams University Hospitals, a prospective randomized study was conducted over 30 patients of acute cholecystitis: 15 of them underwent laparoscopic cholecystectomy within 72 hours, and the other 15 after 6- 8 weeks. Operation time, intraoperative and postoperative surgical complications and duration of hospital stay were assessed and compared in the 2 groups.

Results: Although the operation time was longer in the group with early laparoscopic cholecystectomy, but the overall complications along with the total hospital stay were less in this group of patients.

Conclusion: Early timing of laparoscopic cholecystectomy in relation to the onset of gall bladder inflammation may reduce the conversion rate and the total complication rate. So, early laparoscopic cholecystectomy for patients with acute cholecystitis has both medical and socioeconomic benefits and it is the preferred approach in comparison to delayed approach.

Key words: Acute cholecystitis, laparoscopic cholecystectomy, conversion to open surgery, open cholecystectomy, early cholecystectomy, delayed cholecystectomy.

INTRODUCTION

Gall bladder disease is among the leading causes for hospital admission for acute abdomen among adults and the most common indication for abdominal surgery in the elderly ***(Ukkonen et al., 2015).***

Gallstones are common and present as acute calculus cholecystitis (ACC) in 20 % of patients with symptomatic disease, with wide variation in severity. In developed countries, 10–15 % of the adult population is affected by gallstones ***(Shaffer, 2005).***

Acute cholecystitis (AC) is one of the important causes of abdominal pain on presentation to the emergency department. Early diagnosis and treatment of AC has a positive effect on morbidity and mortality ***(Yokoe et al., 2012).***

Acute cholecystitis is usually diagnosed based on the presence of non-characteristic local and/or systemic inflammatory findings and/or the result of ultrasonographic examination ***(Sekimoto et al., 2007).***

Although there are no specific diagnostic criteria for AC, if it is seen at an advanced stage, it may lead to mortality. The grading of AC is necessary for not only defining the severity of AC but also planning early or elective cholecystectomy ***(Miura et al., 2013).***

Cholecystectomy has since long been the therapy of choice for elective treatment of patients with symptomatic gallstone disease ***(Chang et al., 2009).***

The standard treatment for symptomatic cholecystitis associated with gallstones is cholecystectomy. Laparoscopic cholecystectomy (LC) has replaced conventional open cholecystectomy and has become the gold standard of treatment for acute cholecystitis (AC). In recent years, laparoscopic surgery has been confirmed to be preferable to open surgery in elective cholecystectomy cases. Open cholecystectomy (OC) used to be preferred because of the technical difficulties and the high complication rates associated with LC. However, several studies have shown that LC is safe and can be recommended as a form of cholecystectomy ***(Teoh et al., 2007).***

Laparoscopic cholecystectomy (LC) is an important approach for treating acute cholecystitis nowadays. Issued data indicated that approximately 917,000 and >50,000 LCs were annually performed to treat acute cholecystitis in the United States and England, respectively ***(Wu et al., 2015).***

Another controversial topic is the optimal timing of surgery in AC, where one of the issues is whether it should be operated early (i.e., within the first 48 to 96 h) or delayed (within the same hospital stay), depending on the actual practical and logistic circumstances ***(Lau et al., 2006).***

Over the years, it has been claimed that AC can be primarily treated conservatively and then followed by delayed elective cholecystectomy. In recent decades, evidence has been gathered to show that early cholecystectomy for AC during the acute hospital stay is safe and cost-effective ***(Casillas et al., 2008).***

Traditionally, given the higher rate of morbidity such as bile duct injury, leakage, and conversion to open surgery, the delayed LC (DLC), which is defined as at least 1 week after initial conservative treatment, is commonly adopted in treating acute cholecystitis. However, several clinical studies supported early LC (ELC) (within 7 days of the onset of symptoms) to treat acute cholecystitis ***(Zhou et al., 2014).***

Thus, in the late 1980s early surgery for acute cholecystitis had gained popularity. The updated Tokyo Guidelines announced in 2013 by the Japanese Society of Hepato-Biliary-Pancreatic Surgery suggested that early laparoscopic cholecystectomy is the first-line treatment in patients with mild acute cholecystitis, whereas in patients with moderate acute cholecystitis, delayed/elective laparoscopic cholecystectomy after initial medical treatment with antimicrobial agent is the first-line treatment.

A French nationwide registry study has recently shown that operation within 3 days after admission is recommended in patients with acute cholecystitis ***(Polo et al., 2015).***

AIM OF THE WORK

The aim of this study is to prospectively compare between early and delayed laparoscopic cholecystectomy as a management of acute calcular cholecystitis along with their operative and post-operative outcomes.

Chapter 1
SURGICAL ANATOMY OF THE BILIARY TREE

The anatomy of the bile duct follows that of the portal system and segmentation of the liver. A bile duct is part of the portal triad, which enters the liver through invagination of Glisson's capsule at the hilum. According to the vascular anatomy, the right and left hemiliver are drained by a right and a left hepatic duct, respectively. Segment 1 is drained by several ducts joining both the right and left ducts close to the biliary confluence at the hilum ***(Denis Castaing, 2008).***

Anatomy of Intrahepatic Biliary Tract

Biliary tract is composed of intrahepatic and extrahepatic components. Intrahepatic biliary drainage system parallels the portal venous and hepatic arterial supply and based on their branching pattern the liver is divided into physiological right and left lobes and segments. The left lobe is divided into medial and lateral sections or sectors by the umbilical fissure. The left lateral section is divided into superior (segment II) and inferior (segment III) segments. Union of ducts of segment II and III behind the umbilical part of left portal vein form the left hepatic duct (LHD) which then receives the duct from segment IV. Average length of the LHD is 1.7 cm and diameter is 3.0 mm (±1.08). Right lobe is divided into anterior and posterior

sections or sectors, each of which is further divided into superior and inferior segments. The right anterior sectoral duct (RASD) drains segments V and VIII and the right posterior sectoral duct (RPSD) drains segments VI and VII. The RPSD passes horizontally and generally curves round the RASD to join its medial side to form the right hepatic duct (RHD). Average length of RHD is 0.9 cm and diameter is 2.6 mm (±1.2). Both right and left hepatic ducts drain the caudate lobe (segment I). This pattern of formation of RHD is observed in 57% and LHD in 67% population ***(Vakili and Pomfret, 2013).***

Biliary confluence

The main biliary confluence is formed outside the liver parenchyma, before becoming distal to the common hepatic duct. It runs along and anterior to the origin of the right branch of the portal vein ***(Hribernik et al., 2010).***

The duct is displaced superiorly and medially to the left of the main portal vein. This classic junction occurs in 61% of instances ***(Bismuth and Corlette, 2008).***

At the level of the hilum, Glisson's capsule is both thicker and denser, forming the connective tissue of the hilar plate. The biliary ducts are enclosed within this tissue. Adhesions between this capsule and arterial and portal branches are less important. It is therefore easy to dissect the portal branches at the hilum, but more difficult for the arterial

branches and almost impossible to separate the bile duct of the hilar plate. Owing to the absence of vascular interposition at the anterior part of the hilar plate, it is also possible to separate the hilar plate and hepatic parenchyma of segment 4 ***(Kogure et al., 2009).***

Segment 1/segment 4

The number of portal branches of segment 1 varies from 1 to 6 (average 3). Segment 1 has its own biliary drainage. The left hepatic duct receives one (or more) duct of segment 4 and one or two ducts of segment 1. The right duct receives one duct of segment 1. Biliary drainage of segment 1 goes to both hepatic ducts (80%). However, in 15% its goes only to the left hepatic duct and in 5% to the right, always close to the biliary confluence at a variable location.

The segment 1 ducts are posterior, running above the portal branch and joining the corresponding bile duct on its posterior margin ***(Denis Castaing, 2008).***

The Gall bladder:

The gallbladder is 7-10 cm long and has a capacity of 30-50 ml. It is located on the visceral surface of the liver in a shallow fossa at the plane dividing the right lobe from the medial segment of the left lobe. In other words, the gallbladder fossa is found at the junction of the quadrate lobe (segment IV) and the right lobe of the liver along the line of Rex. The