Recent advances in management of biliary injuries after laparoscopic cholecystectomy

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General surgery

Submitted by
Mohamed Ismail Mohamed Ismail
M.B., B. CH.

Under the Supervision of
Prof. Dr. Hossam El-Deen Hussein El-Azazi
Professor of general surgery
Faculty of medicine Ain Shams University

Prof. Dr. Gamal Abd El-Rahman El-Mowaled
Ass. Prof. of general surgery
Faculty of medicine Ain Shams University

Prof. Dr. Hamed Hussein Abo Setit
Ass. prof. of general surgery
Faculty of medicine Ain Shams University

Ain Shams University
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Mohamed Ismail Mohamed.

CONTENTS

List of figures

List of abbreviations

ALT	Alanine aminotransferase
AP	Alkaline phosphatase
BBS	Benign biliary stricture
BDI	Bile Duct Injury
BPP	Biliary percutaneous procedure
EBF	External biliary fistula
EBS	Endoscopic biliary sphincterotomy
HP	Hartmann pouch
LFTs	Liver function tests
MRA	Magnetic resonance angiography
MRI	Magnetic resonance imaging
MS	Mirrizi syndrome
NBT	Nasobiliary tube
OC	Open cholecystectomy
RPLD	Right postero-lateral duct
US	Ultra-sound
CBD	Common bile duct
CHD	Common hepatic duct
CT	Computed tomography

CD	Cystic duct
ERCP	Endoscopic retrograde cholangiopancreatography
EBDs	Extra hepatic bile ducts
GB	Gall bladder
HA	Hepatic artery
HJ	Hepaticoo-jejunostomy
HIDA	Hepatobiliary iminodiacetic acid scan
IBDs	Intra hepatic biliary ducts
IOC	Intraoperative cholangiography
LC	Laparoscopic cholecystectomy
LHA	Left hepatic artery
LHD	Left hepatic duct
MRCP	Magnetic resonance cholangiopancreatography
MPD	Main pancreatic duct
PTC	Percutaneus trans-hepatic cholangiography
PV	Portal vein
RASD	Right anterior sectoral duct
RHA	Right hepatic artery
RHD	Right hepatic duct
RPSD	Right posterior sectoral duct

Introduction

Laparoscopic cholecystectomy in the late1980s has replaced open cholecystectomy as the gold standard for surgical treatment of benign gallbladder disease. Despite the advantages of laparoscopic cholecystectomy over open cholecystectomy, the incidence of common bile duct injury, which is the most common and serious complication during laparoscopic cholecystectomy, has increased from 0.2% to 0.7% compared with 0.1% to 0.4% during open cholecystectomy **(Zhi-Bing et al., 2009).**

Biliary injury during cholecystectomy is frequently missed at the time of surgery and may remain unrecognized in the postoperative period, often leading to a significant delay in identifying the problem **(Thomson et al., 2006).**

Risk factors for biliary injuries include training and experience ,anything interfering with visualization intraoperative, acute inflammation ,fat in portal area ,chronic inflammation with dense scarring , operative bleeding, aberrant anatomy which is a common danger in biliary operations **(Soper et al., 1995).**

Biliary injuries may be caused either by misidentification of anatomical structure or technical difficulties **(Soper et al., 1995).**

It has been suggested that the commonest cause of common bile duct injury is misidentification of biliary anatomy (70–80 per cent of injuries) **(Hugh, 2002).**

The most used system to classify bile duct injuries during open cholecystectomy is the bismuth classification, this classification is based on the length of remaining bile duct and doesn’t include bile leaks from the

cystic duct stump or liver bed, and it also neglects lateral injuries to the bile duct. These injuries have all been reported following laparoscopic cholecystectomy, so there is new classification for bile duct injury during laparoscopic cholecystectomy **(Soper et al., 1995).**

Clinical presentation of biliary injuries includes: abdominal pain, fever and abdominal tenderness caused by bile collecting locally or generally in the peritoneal cavity. However, a few patients present with vague symptoms such as anorexia or failure to thrive **(Soper et al., 1995).**

Initial symptoms may be nonspecific; patients are discharged from hospital frequently reappearing a few days later with classical symptoms and signs of biliary leak or transection of the bile duct. These include jaundice, biloma, sepsis, biliary fistula (with or without jaundice) and biliary peritonitis **(Lee et al., 2000).**

Late presentation includes recurrent cholangitis and secondary biliary cirrhosis. It has not been established if routine placement of drains allows earlier detection of a bile leak, but any patient remaining unwell 48 h after surgery should be investigated for possible bile duct injury **(De Wit et al., 1999).**

Injury to the biliary tree during laparoscopic surgery remains a significant problem. Successful repair has been reported in 84–92 per cent of patient **(Boerma et al., 2001).**

When an injury is recognized during laparoscopic cholecystectomy, however, immediate open conversion and repair by an experienced surgeon is associated with reduced morbidity, shorter illness and lower cost **(Thomson et al., 2006).**

Management depends on the timing of recognition of injury and may be considered as intraoperative, early and delayed. If a bile leak from a duct is

identified within the proximal gallbladder fossa or hilum, a major injury should be suspected, as it is known that outcome is improved when an experienced hepatobiliary surgeon is present. As for early postoperative management for a partial defect in the duct, the best option is primary closure with fine absorbable sutures and subhepatic drainage, rather than placement of a T-tube, also endoscopic stenting or sphincterotomy can be performed in the event of postoperative bile leak and have a 57–70 per cent chance of success. For delayed management, initial treatment should focus on resuscitation of the patient, drainage of any collections to create a controlled enterocutaneous fistula and treatment of sepsis. Nutritional support should be maintained during subsequent definition of the anatomy and definitive repair **(Conner et al., 2006).**

There is several techniques to prevent injury: a 30◦ telescope, avoidance of diathermy close to the common hepatic duct, avoidance of dissection close to the common bile duct–cystic duct junction, and conversion to an open approach when uncertain **(Troidl, 1999).**

Aim of the work

The aim of this study is to outline the biliary injuries after laparoscopic cholecystectomy, how to diagnose and new ways of management whether surgical or with interventional radiology.