RECENT TRENDS IN MAMNAGEMENT OF POST CHOLECYSTECTOMY COMMON BILE DUCT INJURY

Essay

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وأنزل الله عليك
الكتاب والحكمة
وعلَّمَكَ مَا لَمْ تَكُن
تَعْلَمُ وكَانَ فَضْلُ اللَّهِ
عَلَيْكَ عَظِيماً
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By Bahaa El den Ahmed Abd El mageed

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BDIs	Bile duct injuries.
BTI	Biliary tract injury.
BT	Biliary track.
CVS	Critical view of safety.
CHD	Common hepatic duct.
CBD	Common bile duct .
CBDI	Common bile duct injuries .
CD	Cystic duct.
CT	Computed topography.
CCC	Cholecystocholangiography.
ERCP	Endoscopic retrograde cholangiopancreatography.
ENBD	Endoscopic nasobiliary drainage.
EHBT	Extra-Hepatic Biliary Tract .
GB	Gall bladder .
HPB	Hepatopancreatobiliary.
HJ	Hepaticojejunostomy.
HIDA	Hepatobiliary iminodiacetic acid.
HB	Hepatobiliary.
ICG	Indocyanine green.
IOC	Intraoperative cholecystography and cholangio-graphy.
IBDI	Iatrogenic bile duct injuries.

I- List of Abbreviations

LC	Laparoscopic cholecystectomy .
LHD	Left hepatic duct.
LFT	Liver function tests.
LUS	Laparoscopic ultrasound.
MBDI	Major bile duct injuries.
MRI	Magnetic resonance image.
MRCP	Magnetic resonance cholangiopancreatography.
NIRF-C	Near-infrared fluorescence cholangiography.
PTBD	Percutaneous transhepatic biliary drainage.
PTCD	Percutaneous transhepatic drain.
PTC	Percutaneous transhepatic cholangiography.
RHD	Right hepatic duct.
RYH	Roux-en-Y hepaticojejunostomy.
US	Ultrasound.

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Introduction

Bile duct injury is the most serious complication that can occur during cholecystectomy. It is associated with significant morbidity, affecting quality of life, incurring high cost. Factors considered important in minimizing the incidence of bile duct injury include surgical skills and experience, as well as the use of intra operative cholangiography**. (Pandanaboyana et al., 2010)**

Anatomical anomalies is one of the factors that increases incidence of intraoperative iatrogenic injures which by extension increasing postoperative complications. Variations in the anatomy of gallbladder, bile ducts and the arteries that supply them and liver are important to the surgeon because failure to recognize them may lead to inadvertent ductal ligation, biliary leaks and strictures after laparoscopic cholecystectomy. Congenital anomalies of extra hepatic biliary tree have long been recognized but are rare and may be of clinical importance because they may provide surgeons with an unusual surprise during laparoscopic cholecystectomy. These anomalies include aberrant or accessory biliary ducts, aberrant cystic duct, bile duct cysts, alteration of biliary tract associated with situs inversus and anomalous junction of bile duct to pancreatic duct. **(*Talpur* et al. ,2010)**

Introduction

Generally, iatrogenic bile duct injuries, which were first described by Sprengel in 1891, may occur during several abdominal interventions, such as hepatobiliary, pancreatic, gastric and duodenal surgeries. Today, its incidence is highest during the cholecystectomy (0.1-0.2%) and especially after the laparoscopic cholecystectomy (0.4-0.6%). About 77-89% of the injuries are noticed during the post-operative period. **(*Karabulut et al. ,2012)***

Several groups have devised classification systems that attempt to convey mechanism and level of injury, as well as the complexity of repair that will be required. The system proposed by Bismuth and Majno was based on the level of chronic biliary strictures. The Stewart and Way system addressed acute injuries and incorporated mechanism of injury. Strasberg et al. unified these two systems and classified injury based on anatomic location and the complexity of repair required. This system is relatively complex but defines injuries in a very precise manner. **(*Robert et al. ,2011)***

Bile duct injury is the most feared complication of cholecystectomy. Usually manifesting itself in the early post-operative period as biliary leak leading to localized collection, persistent drain discharge or biliary peritonitis. However, an injury may pass unnoticed with the patient

remaining asymptomatic and presenting months after the surgery with progressively deepening jaundice due to the development of a stricture. Early recognition of a biliary leak is essential to minimize the potentially high morbidity and mortality associated with biliary tree injuries. **(*Ainul et al. ,2013)***

For the diagnosis of bile duct injuries, many imaging methods are used. If injury is suspected during the surgery, cholangiography would be one of the most useful imaging methods to determine the localization and the extent of the injury. When bile duct injury is suspected post-operatively, the imaging method of choice should be ultrasonography (US). Here, it is aimed to detect extended bile ducts, to evaluate intra-abdominal fluid collection and, if available, to confirm the presence of the bile using US assisted percutaneous puncture, aspiration and, if required, to implant an intra-abdominal catheter for the drainage. Contrasted computerized tomography (CT) is superior to ultrasonography in the detection of intra-abdominal abscess and potential vascular injuries. Other modalities that may be used to evaluate the bile ducts include magnetic resonance cholangiopancreaticography (MRCP), endoscopic retrograde cholangiopancreaticography (ERCP) and percutaneous trans hepatic cholangiography (PTC).Although MRCP is a non-invasive diagnostic tool that

clearly describes the anatomy of the bile ducts, it may not show the minor biliary leakages. **(*Chinnery et al. ,2013)***

Some authors have stressed the many steps that can be taken to prevent iatrogenic bile duct injuries. For example, maximum cephalic fundal traction should be applied for better visualization of Calot's triangle; lateral and inferior traction on the Hartmann pouch can open up the angle between the cystic duct and the common hepatic duct and avoid problems of mistaken identification of relevant anatomy; Calot's triangle must be freed of fatty and areola tissue; dissection should start near the neck and then proceed from the lateral to the medial direction, keeping close to the gallbladder; excessive and unnecessary dissection or use of electro cautery must be avoided. Any bleeding should be controlled only after accurate identification of its source and the neighboring structures. **(Waheeb et al. ,2010)**

In treatment, initial focus must be on controlling sepsis by ensuring adequate external drainage of any biliary collections; identifying the source and extent of the biliary leak is the primary step in planning further management options. **(*Chinnery et al. ,2013)***

The management of bile duct injuries can be divided into non-operative and operative repair. The method and timing of repair depends on several factors. The extent of

injury, the expertise of the surgeon and team, the amount of acute inflammation in the area, and the hemodynamic stability of the patient are the most important factors in achieving successful repair .Intraoperative and early repair (< 1 week) are encouraged if a complete diagnosis is achieved and the patient is stable without any infectious intra-abdominal bile collection. If the early repair is missed, operative correction during the weeks from 1 to 6 (intermediate period) is not advised due to much higher rate of complications and treatment failures. Delayed repair is advised in severe bacterial peritonitis or local inflammation and infection. **(*Nordin et al. ,2011)***

In nonoperative management, the primary goal of endoscopic therapy is to reduce the trans-papillary pressure gradient. Consequently, transpapillary flow is improved, and the extravasation out of the bile duct leakage is reduced. In addition to decompressing the biliary system, stent implantation closes the defect and works as a bridge at the site of extravasation. Endoscopic therapy consists of biliary sphincterotomy alone, placement of a biliary stent, or nasobiliary drainage, as well as a combination of these approaches. **(*Chandrasekar et al. ,2012)***