Diagnosis and Management of Bile Duct Injuries During Laparoscopic Cholicystectomy

Essay

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By

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وأنزل الله عليك
الكتاب والحكمة
وعلَّمَكَ مَا لَمْ تَكُنْ
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List of Abbreviations

3D	:Three Dimensional
ALT	: Alanine Transamenase
ASA	: American Society of Anaesesiologists
AST	: ASpartate Transamenase
B.P	: Blood Pressure
BDI	: bile duct injury
BMI	: Body Mass Index
CBD	: Common Bile Duct
CHA	: Common Hepatic Artery
ChD	: Cholydecho Duodenostomy
CT	:computed tomography
CVS	:crtical view of safety
ECG	: Elecro Cardio Giography
EE	: End to End anastomosis
ERCP	:Endoscopic Retrograde Cholangio Pancreatography
GB	: Gall Bladder
GDA	: Gastro Duodenal Artery
HJ	: Hepatico Jejunostomy
I.M	: Intra Muscular
I.V	: Intra Venous
IBDI	:Intrahepatic Bile Duct Injuries

List of Abbreviations (Cont...)

IOC	: Intra Operative Cholangiography
IOC	: intra operative cholangiography
ISGLS	:International Study Group of Liver Surgery
IVC	: Inferior Vena Cava
LC	: Laparoscopic Cholycystectomy
LHA	: Left Hepatic Artery
MRA	: Magnetic Resonant Angiography
MRCP	:magnetic resonance cholangiopancreatography
MRI	:Magnetic resonant Imaging
NIH	: National Institute of Health
NOTES	: Natural orifice transluminal surgery
OC	: Open Cholycystectomy
OCHRA	:Observational Clinical Human Reliability Assessment system
PHA	: Proper Hepatic Artery
PTBD	: Percutaneous Transhepatic Biliary Drainage
PTC	: Percutanous Transhepatic Cholangiography
SMA	: Superior Mesenteric Artery
US	:Ultra Sonography

INTRODUCTION

Biliary calculous disease is one of the most common disorders that occur in humans. The incidence is 10- 20% of the whole adult population in the world, making laparoscopic cholecystectomy one of the most frequently perform operations in the world. (**Townsend et al., 2010).**

Open cholecystectomy has been largely replaced by laparoscopic cholecystectomy since the first reported case in 1987**. (Kaiser et al., 2001).**

As technologies evolve, surgeons continue to improve perioperative patient outcomes by introducing various methods to reduce port size and number. This pursuit of "scarless" surgery has given rise to the concept of Natural Orifice Transluminal Surgery (NOTES) and single incision laparoscopic surgery. **(Kwan et al., 2010).**

Numerous reports have evidenced a lower incidence of postoperative pain, shorter recovery times, and significantly lower mortality and morbidity rates after laparoscopic cholecystectomy compared with open procedures. **(Amareshwar Chiruvella et al., 2010).**

Correct assessment of biliary anatomy can be documented by photographs showing the ''critical view of safety'' (CVS) but also by intraoperative cholangiography (IOC). IOC was superior to photographs of the CVS for documentation of the biliary anatomy during laparoscopic cholecystectomy. However, both methods were judged to be

conclusive only for a limited proportion of patients, especially in the case of cholecystitis. This study highlights that documenting assessment of the biliary anatomy is not as straightforward as it seems and that protocols are necessary, especially if the images may be used for medicolegal purposes. **(Buddingh et al., 2012).**

Timely diagnosis is of paramount importance in preventing the life-threatening complications, such as cholangitis, biliary cirrhosis, portal hypertension, and end-stage liver disease, and death. Most BDIs are not recognized at the time of the index operation. **(Barauskas et al., 2012).**

According to the report of Zvonimir et al., 33% of Bile duct injuries (BDIs) were recognized intraoperatively, and the most common type of iatrogenic BDI was a complete transection, accounting for 42% of cases**. (Zvonimir et al., 2003).**

The early presentation of BDIs after laparoscopic cholecystectomy is often nonspecific in patients reporting vague abdominal pain, persistent nausea, vomiting, and low-grade fever**. (Barauskas et al., 2012).**

Patients who develop delayed symptoms due to a biliary stricture typically present with jaundice and cholangitis. Approximately two-thirds (66%) of cases were diagnosed within 10 days after the surgery. Similarly, as reported by winslow et al., 51% became evident within the first postoperative week. (**winslow et al., 2009).**

Imaging studies, such as ultrasonography and

Computerized enhanced computed tomography (CT) scan, and Magnetic Resonant Cholangio Pancreatography (MRCP) studies play an important role in the initial evaluation of patients with suspected BDI. These studies will identify the presence of intraabdominal collections or ascites. In most cases of bile duct transection, Endoscopic Retrograde Cholangio Pancreatography (ERCP) will demonstrate only a normal-sized distal bile duct up to the site of total obstruction; delineation of the proximal anatomy is usually not possible. Percutaneous transhepatic cholangiography or magnetic resonance cholangio- pancreatography is necessary for the proper diagno- sis and staging of the injury. Percutanous Transhepatic Cholangiography (PTC) may sometimes be advantageous not only defining the proximal anatomy, but also allowing the placement of percu taneous biliary catheters to decompress the biliary tree in the presence of cholangitis**. (Barauskas et al., 2012).**

Biliary complications range from minor ductal leaks, often managed non-operatively, to proximal transactional injuries requiring major biliary and occasionally vascular reconstruction. Several classification methods have been proposed but the Strasberg method remains the most commonly used. **(Jawad et al., 2012).**

The stenosis of bile duct is a complication that often may cause disastrous consequences, such as biliary cirrhosis, liver failure and, ultimately, death. (**Linhares BL et al., 2011).**

Ultrasonography (US) and (CT) cannot reliably distinguish bile from other postoperative fluid collections. Magnetic resonance imaging (MRI) with hepatobiliary agents and MRCP provide anatomic and functional information that allows for prompt diagnosis and excludes any other concomitant complications. (**Francesco Mungail et al., 2013)**.

The management of patients with Intrahepatic Bile Duct Injuries (IBDI) is quite complex, requiring the skills of experienced hepatobiliary surgeons and specialized tertiary care services in the treatment of this type of injury**. (Linhares et al., 2011)**.

Endoscopic techniques are recommended as initial treatment of IBDI. When endoscopic treatment is not effective, surgery is considered. Different surgical biliary reconstructions are performed in most patients in IBDI. Roux-Y hepaticojejunostomy is the commonest biliary reconstruction for IBDI. In some patients with complex IBDI, hepatectomy is required. **(Jablońska, 2013)**.

The prognosis is directly related to the patient's underlying conditions, as well as the time elapsed between the lesion and its identification and treatment. **(Linhares et al., 2011).**

AIM OF THE WORK

The objective of this essay is to: Highlights on iatrogenic bile duct injury with focusing on laparoscopic cholecystectomy resulting injuries.

Chapter(1):

Embryological and Surgical Anatomy of the Intrahepatic and Extrahepatic Biliary Tree

1.1. Normal Development of the Liver and Biliary Tract

The hepatobiliary system develops during the second half of the eighth week of the embryonic stage of development, known as the *organogenetic period.* ***(Moore and Persaud, 2003).***

Many of the anatomic variations of the system are the consequences of occurrences during this period***. (Wind, 2000).***

On approximately the 22nd day, a small endodermal thickening, the *hepaticplate,* appears in the endodermal lining of the caudal part of the foregut, adjacent to the transverse septum***. (Larsen, 2001).***

This outgrowth, the hepatic diverticulum, or liver bud, consists of rapidly proliferating cells that penetrate the septum transversum, that is, the mesodermal plate between the pericardial cavity and the stalk of the yolk sac. ***(Sadler, 2009).***

On the 25th-26th day, the plate begins to proliferate and invaginates into the caudal region of the septum between the right and left venous returns, forming the *hepatic diverticulum (liver bud),*The initially bulbous "head" of the larger cranial part of the diverticulum bears the cells that