Comparison between Two-port Laparoscopic Cholecystectomy and Four-port Laparoscopic Cholecystectomy

Thesis

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بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

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List of Abbreviations

Abbr.	Full-term
ABP	: Acute gallstone (biliary) pancreatitis
AsGS	: Asymptomatic gallstones
CBD	: Common bile duct
CHD	: Common hepatic duct
CT	: Computed tomography
DVT	: Deep vein thrombosis
ERC	: Endoscopic retrograde cholangiography
ERCP	: Endoscopic retrograde cholangiopancreatography
ESR	: European Society of Radiology
EUS	: Endoscopic ultrasonography
LC	: Laparoscopic cholecystectomy
LHD	: Left hepatic duct
MPD	: Main pancreatic duct
MRCP	: magnetic resonance cholangio-pancreatography
MRI	: Magnetic resonance imaging
NOTES	: Natural orifice transluminal endoscopic surgery
OC	: Open cholecystectomy
PM	: Major papilla
PTC	: Percutaneous transhepatic cholangiography
RAD	: Right anterior duct
RHD	: Right hepatic duct
RPD	: Right posterior duct
SD	: Duct of Santorini
TBRI	: Theodor Bilharz Research Institute

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Introduction

Laparoscopic cholecystectomy is considered the ‘gold standard’ for treatment of cholelithiasis. Short length of hospital stay, immediate regaining of physical activity, low prevalence of postoperative pain, morbidity and mortality, and good cosmetic outcomes contribute to the benefits of laparoscopic cholecystectomy ***(Sari et al., 2005).***

The first laparoscopic cholecystectomy was performed in 1987 by Phillip Mouret and was later established by Dubois and Perissat in 1990. Since then, it has met with widespread acceptance as a standard procedure. Standard laparoscopic Cholecystectomy is performed using four trocars. The fourth (lateral) trocar is used to grasp the fundus of the gallbladder so as to expose Callot’s triangle. With increasing surgeon experience, laparoscopic cholecystectomy has undergone many refinements including reduction in port size. Two-ports laparoscopic cholecystectomy has been reported in the international literature to be safe and feasible ***(Dubois et al., 1990).***

The introduction of single-port laparoscopic cholecystectomy (LC) has drawn as much attention and interest as initial introduction of LC ***(Hayashi et al., 2010).*** It provides nearly scarless wound. However, it was not proved to have the other potential benefits such as reducing postoperative pain and return to normal activity ***(Strasberg, 2012).***

In 4-port LC, the critical view of safety is best ensured by three instruments, which enable both attainment of sufficient operative vision and bimanual manipulation. However, as the number of incisions for ports increases, the potential risks of portrelated complications also can increase. Furthermore, as patients have growing awareness of the quality of life, there has been an increase in demand for cosmesis ***(Sreenivas et al., 2014).***

Aim of the Work

To compare between two-port and four-port laparoscopic cholecystectomy and to demonstrate whether there are extra benefits with two-port laparoscopic cholecystectomy.

Chapter (1):
Anatomy of the Gallbladder

I. Embryology of the 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. On approximately the 22nd day, a small endodermal thickening, the *hepatic plate,* appears in the endodermal lining of the caudal part of the foregut, adjacent to the transverse septum ***(Wind, 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 constitute the *primordium of the liver parenchyma,* while its "neck" will elongate to become the *extrahepatic portion of the hepatic duct* ***(Moore and Dalley, 2006).***

The smaller caudal part of the hepatic diverticulum, the cystic diverticulum, becomes the *gallbladder*, its "neck" forming the *cystic duct* ***(Ross and Pawlina, 2006).***

The cells forming the gallbladder and cystic duct are from histologically distinct populations of endodermal cells ***(Wind, 2001).***

The stalk of the hepatic diverticulum, between gut (now differentiating into duodenum) and the cystic diverticulum elongates into the *(common) bile duct.* Variations in the gallbladder and extrahepatic duct arise from developmental anomalies that occur during the 4th week (figure 1) ***(Moore and Dalley, 2006).***

During week 6, the extrahepatic ducts recanalize through a process of vacuolation resulting from the degeneration of the occluding cells, starting from the duodenal end. Incomplete recanalization results in a *septated common duct. Ductal atresia,* the most serious affliction of the neonatal biliary system was formerly considered to be a malformation due to a failure to recanalize. However, it is now thought to be a secondary phenomenon, resulting from an inflammatory process that leads to sclerosis of recanalized ducts - most likely a viral infection during late fetal development ***(Skandalakis, 1993).***