

Review

Technical Challenges of Laparoscopic Cholecystectomy in Patients with Cholestasis

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REZUMAT

Particularități tehnice în disecția laparoscopică a colecistului la pacienții cu ficat colestatică

Obiectiv: Scopul acestui studiu este de a rezuma cunoștințele actuale privind colecistectomia laparoscopică la pacienții cu coleastăză

Metodă: Analiză sistematică a literaturii de specialitate până în luna martie 2015, cautarea electronică în bazele de date PubMed/Medline, Web of Science, și Science direct, a termenilor: „cholecistectomy”, „laparoscopy”, „common bile duct stones”.

Rezultate: Tratamentul litazei căii biliare principale (CBP) include colangiopancreatografia endoscopică retrogradă pre sau postoperatorie (ERCP), explorarea chirurgicală a CBP (în manieră clasică sau laparoscopică) sau colangiografia intraoperatorie (CIO). În prezent, tratamentul pacienților cu colecistită și litiază CBP este încă un subiect controversat. Colestaza este un factor predispozant pentru sângerare intraoperatorie și disecție dificilă .

Concluzie: Colecistectomia laparoscopică la pacienții cu boală colestatică este fezabilă numai în mâinile unui chirurg experimentat în chirurgia laparoscopică. Disecția veziculei biliare trebuie făcută aproape de perete colecistic iar litiaza CBP trebuie îndepărtată chirurgical sau prin abord endoscopic. De cele mai multe ori, sângerarea intraoperatorie reprezintă elementul de dificultate al acestor intervenții chirurgicale.

Cuvinte cheie: colecistectomie laparoscopică dificilă, colecistită, litiază coledociană, coleastăză

ABSTRACT

Objective: The purpose of this study is to summarize the current knowledge regarding cholecystectomy in patients with cholestasis.

Method: Systematic review of the literature up to March 2015, using electronic search of the PubMed/ Medline, Web of Science, and Science Direct, databases using as MeSH term or truncated words „cholecistectomy”, „laparoscopy”, „common bile duct stones”.

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Results: The treatment of common bile duct stones (CBD) includes pre or postoperative endoscopic retrograde cholangiopancreatography (ERCP), surgical exploration (open or laparoscopic) of the CBD or intraoperative cholangiography (IOC). Currently the therapy of the patients with cholecystitis and CBD lithiasis is still a subject of controversy. Cholestasis is a proedispousing factor for intraoperative bleeding difficult dissection.

Conclusion: Laparoscopic cholecystectomy in patients with cholestatic disease is feasible only for an experienced laparoscopic surgeon. Gallbladder dissection should be performed close to the cholecyst wall and CBD stones should be surgically removed or by endoscopic approach. Intraoperative bleeding is the most frequent difficulty for such surgeries.

Key words: difficult laparoscopic cholecystectomy, colecystitis, choledocolithiasis, cholestasis

INTRODUCTION

Although mainly asymptomatic, patients with biliary gallstones frequently associate common bile duct (CBD) stones. A percent ranging between 10-18% (1,2) from the patients that underwent cholecystectomy for gallbladder stones associate CBD lithiasis. The presence of CBD stones can be anticipated in the presence of jaundice, cholangitis, pancreatitis, with altered hepatic function, or directly identified by imagistics (3). The percentage of preoperative undiagnosed CBD reaches almost 25% even for the newest imagistics (4). Acute cholecystitis is the most common infectious complication of gallstones, occurring with a frequency of 6-11% for the patients with 7-11 years of symptomatic gallstones (5). Recent studies are showing indirect signs of CBD stones in 37.7% of patients with acute cholecystitis, these signs being noticed for 72 % of patients with proved choledocholithiasis (6).

Changes in liver morphology was seen in 66% of patients with gallstones and cholecystitis (7), the most important alteration being non-specific reactive hepatitis and hepatic steatosis. More important changes were noticed for patients with CBD obstruction or cholangitis were associated more strongly with CBD stones (8); cholestasis has been found for 28% of the patients with CBD stones (7). Moreover, jaundice and pain in the right upper quadrant were associated in all cases with altered liver pathology (7). Ishizaki et al., have found post ERCP status to be a significant predictor of difficulty in adhesiolysis and Calot's triangle dissection (9).

METHOD

Systematic review of the literature up to March 2015, was performed using electronic search of the PubMed/Medline, Web of Science, and Science

Direct, databases using as MeSH term or truncated words „cholecystectomy”, „laparoscopy”, „common bile duct stones”. Bibliography of the retrieved articles has been used for secondary searches.

Treatment alternatives

The treatment of common bile duct stones includes pre or postoperative endoscopic retrograde cholangiopancreatography (ERCP), surgical exploration (open or laparoscopic) of CBD or intraoperative cholangiography (IOC). In the era of Open Cholecystectomy, intraoperative exploration of CBD had better results than ERCP (10). At the beginning of minimally invasive surgery, laparoscopic exploration of extrahepatic bile ducts was not technically feasible, cleaning biliary tree being afterwards more often performed using ERCP (11) and subsequently through laparoscopic surgery (12) at first by transcystic approach and then with the advanced laparoscopic technique of choledocotomy (13,14).

Currently the therapy of the patients who cholecystitis to CBD lithiasis is still a subject of controversy (14-16). Although there are no differences in terms of morbidity and mortality between laparoscopic exploration of CBD and perioperative ERCP(15) Endoscopic Retrograde CholangioPancreatography followed by laparoscopic cholecystectomy is the preferred method. In the presence of complications such as biliary pancreatitis with jaundice or cholangitis, the gold standard for removing choledocolithiasis is ERCP with sphincterotomy (18-19), some studies reporting a higher frequency remnant choledocolithiasis after postoperative ERCP (17).

The intraoperative cholangiography procedure (catheterisation of the CBD, followed by dye injection), can improve visualization of the biliary tree anatomy. While the combination of LC + IOC is fre-

quently used in medical centers worldwide, the precise benefits for patients remains to be established (16). Nevertheless in the era of Magnetic Resonance CholangioPancreatography (MRCP), IOC indications have decreased but are not yet considered obsolete, but rather a valuable tool for evaluation of biliary tree anatomy, bile duct injury, or suspected choledocholithiasis (17). In terms of benefits to patients, efficacy and safety, IOC addition to the routine LC treatment of symptomatic cholelithiasis does not improve rates of remnant CBD stones or bile duct injury but lengthens the operative time (16).

Procedures timing

Regarding the time interval between procedures, clearance of both CBD and gallbladder stones is recommended during the same hospitalisation (12), the proper time of surgery being within 5 days from onset of symptoms (20) moreover laparoscopic cholecystectomy, Laparoscopic cholecystectomy after more than 16 weeks from the endoscopic sphincterotomy associated a 10 times risk of bile duct injury (BDI) (19). Latest trends in surgical attitude indicate as feasible the same-day ERCP and cholecystectomy with an overall 2 days decrease of hospitalization (20).

Surgical technique

Inspection

Pericolecistic inflammatory process that can extend from the gallbladder to the great omentum, right flexure of the colon, duodenum and visceral surface of the liver can cause difficulties from the beginning of surgery in order to identify the gallbladder and to expose the subhepatic space.

Gallbladder exposure and adhesiolysis

Liver disease increases the difficulty of the surgery, especially in the presence of cirrhosis, and liver failure. Jaundice and hepatic cholestasis, hepatic diseases predispose to bleeding and difficult dissection. Moreover, excessive bleeding during adhesiolysis, due to local inflammation associated with hypocoagulability caused by hyperbilirubinaemia, can flood the operative field.

Electrodissection and electrocoagulation should be avoided because of the risk of thermal injuries, especially when local anatomy is altered. Exposing the visceral surface of the liver in patients with inflammatory process is a key step of the interven-

tion, the pericholecystic inflammatory mass and adhesions representing the leading cause for conversion to open cholecystectomy (21). After the exposure of the gallbladder fundus, the surgeon can choose puncture followed by aspiration of its content, especially in patients with important gallbladder distension allowing a better traction and exposure, taking in consideration the subsequent the parietal swelling and thickening, factors that make difficult the gallbladder handling.

Infundibulum exposure

Difficulty can be encountered in gallbladder grasping especially in patients with contracted or distended, gallbladder, with the tendency to slip away. Presence of inflammation around the gall bladder makes the wall fragile and oedematous, with problems for grasping (22–24). Starting dissection in the most accessible point and achieving good orientation is the key of a successful difficult cholecystectomy (25) – it will be not forgotten the golden rule of dissection very close to the gallbladder wall.

In the case of impacted gallstones that can alter infundibular grasping, a cholecystendesis can be used to empty the gallbladder (2–3 cm above the infundibular-cystic region), but with the risk of intense bleeding from the parietal transection, and bile contamination of the peritoneal cavity. Specialized toothed graspers with long and wide mouth can facilitate a good traction (23).

Dissection of the Calot triangle

If possible, dissection is usually started at the gallbladder's neck for a proper exposure of the Calot triangle, if not the surgeon should approach dissection as close as possible to the gallbladder infundibulum, in the area where the anatomical landmarks are clearly visualized. In the onset of hepatic pediculitis with altered local anatomy, and a dark operating field (due to the presence of blood absorbing most of the light), careful blunt dissection with proper element identification is mandatory.

If anatomy is unclear, the recommendations are to keep the dissection plane tight close to the gallbladder wall. Kelly et al. noticed that anterograde approach in cases with severe inflammation can reduce the conversion rate from 5,2% to 1,2% (26).

Bleeding from Calot's vascular arcade is usually mild and self limited and can be controlled by pad compression, followed by permanent haemostasis (usually clip or ligature) (27).

Cystic artery and duct management

During this step of the dissection the surgeon could benefit from intermittent lavage and suction along with blunt dissection to maintain a clear operative field. Bleeding in this time of the dissection occurs either from cystic or right hepatic artery. The bleeding is sometimes diffuse and a pad can help if continuous pressure is applied for enough time. Most often diffuse bleeding stops due to spasm of the small vessels. If bleeding continues, another efficient method is to clean the blood clots with the suction device, and, once the vessel is visible, the surgeon should grasp the bleeding vessel with the left hand grasper (27).

Once the cystic artery sealed, after proper identification, the bleeding is usually reduced. For the cystic duct seal the surgeon should be ready with large clips, hence it is common for patients with CBD stones to have a larger cystic. In patients with a wide and short cystic duct, or in cases where clips cannot be used, intracorporeal knots or EndoGIA stapler can be used to seal the cystic duct. As a general rule, it is recommended a good visualisation with both clip ends exposure when applied.

Dissection of the gallbladder from the liver bed

Once both cystic artery and duct were successfully sealed and cut, the surgeon should proceed to remove the gallbladder from the liver bed. In the setting of a cholestatic liver with high bilirubinemia and high bleeding risk, the key of the dissection is represented by avoiding lesions to the hepatic bed. This can be achieved with a firm but gentle traction with the left grasper and keeping the dissection close to the gallbladder wall. Perforating the cholecyst usually restarts the bleeding at the puncture site, followed by bile and stones spillage in the peritoneal cavity. Bile must be carefully suctioned followed by lavage of the subhepatic space, also stones must be totally removed before being lost in the peritoneal cavity. Some authors found Surgicel (oxidized cellulose polymer) to be the most effective in controlling bleeding from the liver bed. If not available, for 5 minutes can stop the diffuse bleeding (27).

If proper dissection in the liver bed cannot be achieved, a partial cholecystectomy might be an option, leaving the superior gallbladder wall attached to the liver and cauterising the mucosal surface (28).

Gallbladder extraction

An endobag should always be used for extracting the gallbladder and its content from the abdominal cavity avoiding contamination and spillage in the peritoneal cavity.

Complications

Besides morbidity and mortality associated with laparoscopic procedure alone any invasive maneuvers for exploring and cleaning the CBD increase the total risk for the patient. In the setting of cholestasis, the overall morbidity and mortality risk is further increased but it's nevertheless strongly connected to the surgeon's experience. These „difficult” laparoscopic cholecystectomies should be attempted only after the surgeon passed the learning curve. Common bile duct injuries not only increase morbidity but can also be fatal, even if recognized intraoperatively, sometimes with redo surgeries (often with unsatisfactory results).

CONCLUSION

Laparoscopic cholecystectomy in patients with cholestatic disease is feasible only for an experienced laparoscopic surgeon. Gallbladder dissection should be performed close to the cholecyst wall and CBD stones should be surgically removed or by endoscopic approach. Intraoperative bleeding is the most frequent difficulty for such surgeries.

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