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Difficult Gall Bladder: Exit Strategies

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ABSTRACT
Bile duct injury during laparoscopic cholecystectomy is a serious surgical complication. It often occurs as a result of misidentification of anatomy. The operating surgeon should be able to recognize such injury. Various methods for recognising this injury exist and they have been reviewed in this article. There is currently less clinical evidence to conclude which bailout method is superior to the others, so the surgeon should choose one particular bailout procedure based on the intraoperative findings and personal experience.

INTRODUCTION

Bile duct injury (BDI) during laparoscopic cholecystectomy remains a serious iatrogenic surgical complication. BDI most often occurs as a result of misidentification of the anatomy., however, clinical evidence on its precise mechanism and surgeons' perceptions is scarce. It is important for the operating surgeon to be able to identify when the dissection is becoming dangerous, with a high risk of biliary/vascular damage, during the operation. Prudence lies in understanding this danger well before the procedure proceeds in to the zone of great risk[2] so that the procedure can be stopped at a point of safe return. Thus the operating surgeon should be able to recognize or pre-empt the difficult situation that could increase the risk of biliary/vascular injury with the aid of some telltale signs.

Strong adhesions, severe acute inflammation, a large impacted stone in the gallbladder's neck, Mirizzi syndrome, or chronic inflammation with fibrosis or scarring may all contribute to the difficulty. Such circumstances can result in a failure to progress the dissection in a timely manner, anatomic disorientation, and difficulty visualising the operative area. These are the operative clues.

In the event of an unexpected discovery, a troublesome gallbladder, irregular anatomy, or a difficult dissection, the operating surgeon should pause and request a second opinion from another surgeon[1,4]. Misidentification is the most common cause of biliary/vascular injury (65%), with the CBD/CHD being misidentified as the cystic duct and the hepatic artery being misidentified as the cystic artery. In as many as 18% of cases, however, misidentification can be avoided with the help of a second surgeon, emphasising the importance of getting a second opinion. When a second opinion is required, the operating surgeon should not hesitate to pursue one, and this should be viewed as a sign of good clinical practice rather than a sign of surgical incompetence.

Various methods for intraoperative assessment of biliary anatomy have been identified, with the potential to reduce the incidence of BDI. While several studies indicate that these strategies have a protective impact, further research is needed before they can be recommended as a standard practice.

MATERIALS AND METHODS

Intraoperative cholangiography (IOC) is the most widely used and researched technique for assessing biliary anatomy, identifying and assessing the degree of biliary injury and possibly preventing biliary ductal injury during surgery. IOC has been linked to lower rates of BDI in several large retrospective data[5]. It's a low-risk (minimally invasive) procedure with a 90 percent-95 percent success rate, as well as the ability to detect asymptomatic CBD stones. IOC, on the other hand, can be inconvenient at times. In patients with short and thin cystic ducts, ductal cannulation can be difficult. This extra procedure increases the operative time and expense and it requires a learning curve for proper interpretation. IOC has been shown in several studies to reduce the risk of BDI and to aid in the early detection of such injuries. However, its numerous drawbacks can prevent it from being a standard part of clinical practise. The controversy about whether IOC should be conducted regularly or selectively continues., based on the available literature, routine IOC cannot be recommended[6].

Laparoscopic Ultrasound: Many studies show that laparoscopic ultrasound (LUS) will help prevent BDI. It is extremely healthy because it is non-invasive. Non-invasiveness, shorter procedure time, higher success rates, and lack of radiation exposure are some of the advantages of LUS over IOC. However, it is less precise in assessing the biliary system's intrapancreatic and intrahepatic components.

Near Infrared Fluorescent Cholangiography: The most recent addition to the armamentarium for intraoperative biliary tract evaluation is near infrared fluorescent cholangiography. Efficacy and protection have been shown in a number of studies. As compared to IOC, this method takes less time, is less expensive, and is safer. However, since it is a modern method, it has yet to be tested in different biliary pathologies. There is currently insufficient evidence to suggest it for routine use in the detection of CBD stones or BDI recognition[17]. No one approach is superior to the others among the currently available imaging methods. Depending on the operating surgeon's discretion, IOC or LUS may be done regularly or selectively.

Surgical Options: In the case of a difficult gallbladder, it is not necessary to pursue the target of a total cholecystectomy at the expense of the patient's safety due to the possibility of biliary/vascular injury. Rather, an alternative procedure (bailout techniques) must be performed to enable the surgeon to complete the procedure safely. Below are five options for dealing with a troublesome gallbladder: (1) Abort the procedure altogether., (2) Convert to an open procedure., (3) Tube cholecystostomy., (4) Subtotal cholecystectomy (STC, open/laparoscopic) and (5) Fundus first cholecystectomy. The best option will be determined by the clinical condition as well as the surgeon's experience and knowledge.

Abort the Procedure: The safest way out is to cancel the treatment completely. Dense pericholecystic adhesions caused by severe acute or chronic inflammation combined with gallbladder non-visualization can force the surgeon to use this method. Antibiotics should be continued (with a percutaneous cholecystostomy if necessary).

Convert to Open: Converting to an open method is also a secure choice, but it should be approached with caution. It's important to understand that simply switching to an open procedure won't protect from bile duct/vascular damage. Even after conversion to open, a difficult procedure can remain difficult, with no impact on postoperative complications[8].

RESULTS AND DISCUSSIONS

Tube Cholecystostomy: Tube cholecystostomy is a simple temporary procedure that relieves symptoms before a more permanent procedure can be done. It can be done laparoscopically or as an open procedure after conversion. It's necessary to note that the LC interval can be challenging again, with a higher conversion and morbidity rate[9].

Subtotal Cholecystectomy: STC is a viable and secure alternative to total cholecystectomy when complete gallbladder removal is not feasible due to a frozen, scarred, or fibrotic HC triangle or extreme inflammation. A difficult dissection in the HC triangle with the risk of BDI in an effort to remove the entire gallbladder is not preferable to leaving a portion of the gallbladder behind.

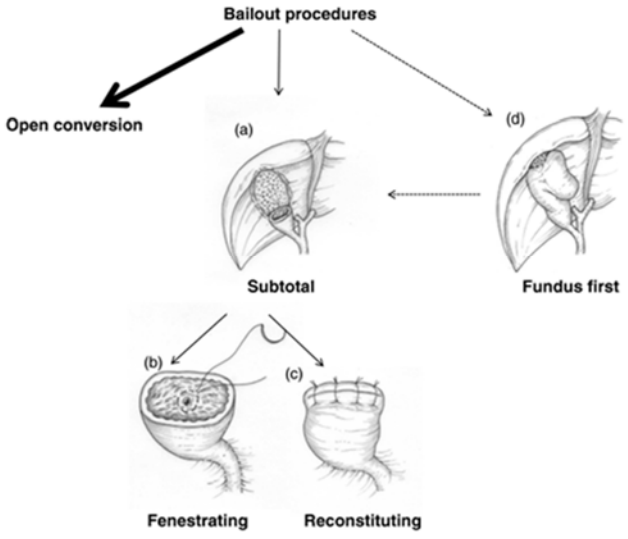

Fig. 1: Surgical Procedure

STC can be done laparoscopically or open[9]. It's important to get rid of all the stones in the gallbladder, ablate the mucosa of the gallbladder stump (with diathermy or an argon plasma coagulator) and keep the stump as small as possible. Depending on whether the stump is closed or left uncovered, there are two forms of STC[10,11]. namely the subtotal fenestrating type and the subtotal reconstituiting type.

These procedures are both safe and effective alternatives to complete cholecystectomy. Intraoperative conditions (degree of inflammation, tissue friability, scarring level and so on) can determine which type to use., in most cases, the surgeon's judgement is relied upon[12].

While both forms of STC minimise the risk of biliary/vascular complications, they are not completely avoidable[10,12]. STC is also linked to specific postoperative complications. With subtotal reconstituting cholecystectomy, the risk of biliary events (recurrent cholelithiasis in the gallbladder stump, cholangitis, choledocholithiasis, and biliary pancreatitis) is higher. Fenestrating STC is linked to a higher risk of bile leak after surgery[11,12]. Endoscopic management of chronic bile leak may be needed in approximately 10% of cases[12] and completion cholecystectomy for recurrent cholelithiasis may be required in 5% of cases[13].

In cases where dissection is difficult to prevent severe biliary or vascular injury, both the existing IRCAD recommendations and the TG-18 guidelines consider STC as an effective and safe alternative procedure[7]. This bailout procedure, as well as its technical aspects, risks and effects, should be familiar to the surgeon. The surgeons must meticulously record this procedure in the operation notes.

Fundus First Technique Although its protection has not been conclusively proven[1], the fundus first technique (dome down, fundus down, retrograde) has been identified as a bailout technique[17], it can also act as an error trap[14]. The surgeon can use this procedure only if he or she has a thorough knowledge of normal cystic and hilar plate anatomy, as well as pathological changes caused by acute severe or chronic inflammation involving the hepatocystic triangle and the gall bladder.

The dissection should be done as close to the gallbladder wall as possible[7]. In addition to lowering the rate of conversion to open cholecystectomy in difficult situations, it may also make STC easier if full cholecystectomy is not feasible or is deemed dangerous after using the fundus first technique.

CONCLUSION

Since there is currently insufficient clinical evidence to conclude that one bailout procedure is preferable to

another[5], the surgeon should use his or her own judgement to choose a particular bailout procedure based on intraoperative findings and his or her experience. Many surgeons tend to convert to an open procedure or perform an STC in practise. Cholecystostomy is the least preferred bail out procedure.

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