

# Iatrogenic Injury to the Common Bile Duct

Sead Buturovic

Department of Surgery, General hospital Konjic, Konjic, Bosnia and Herzegovina

**Corresponding author:** prof. Sead Buturovic, MD, PhD. Department of Surgery, General hospital Konjic, Konjic, Bosnia and Herzegovina.  
E-mail: sean@bih.net.ba

## ABSTRACT

**Introduction:** The formation of gallstones in the gall bladder is very common. It is now considered that approximately 10% to 15% of the adult population has gallstones. It is more frequent in women than men. Etiologies are various and include: age, sex, diet, sudden weight loss, etc. According to the report of the US National Institute of Health, it is estimated that 6.3 million men and 14.2 million women, aged 20-74 years in the United States has calculosis of the gallbladder, due to which every year is performed about 700,000 cholecystectomy. **Case report:** Male patient, aged about 40 years, admitted at the Clinic and laparoscopic surgery was performed in our department for chronic, as multiple, symptomatic gallbladder calculi. Intraoperative findings showed chronically inflamed, curled gall bladder, and wall thickening. After the first postoperative day there is no content in the drain bag and it is taken out, and the patient leaves the hospital without any problems. The seventh post-operative day occurred abdominal pain, weakness and fatigue, with striking yellow skin and visible mucous membranes. Clinical, laboratory and echo determined abdomen full of fluids, so it was suspected lesion of the bile duct. Urgent revision was performed. Intraoperative was found a lesion of the common bile duct in the form of a complete interruption. Created is anastomosis through transhepatic drain according to Pradera. Early and late postoperative flow was entirely normal with normal laboratory and echofindings. Control, contrast imaging through a drain showed the orderly flow of extrahepatic bile ducts, with minimal extravasation of contrast. **Conclusion:** At the Department of Surgery of General Hospital in Konjic laparoscopic cholecystectomy is performed since 1999. In the beginning it was done by three trocars (European style), and later, in order to prevent complications or injury of the bile duct is performed surgery with four trocars (American style). The number of complicated procedures in our hospital does not differ from similar indicators in foreign surgical facilities.

**Key words:** common bile duct injury, laparoscopic cholecystectomy, complications.

## 1. INTRODUCTION

The formation of gallstones in the gall bladder is very common (1-6). It is now considered that approximately 10% to 15% of the adult population has gallstones. It is more frequent in women than men. Etiologies are various and include: age, sex, diet, sudden weight loss, etc.

Gallstones do not have to cause any problems and then they are called asymptomatic. But they can cause symptoms such as pain below the right rib cage. The pain is accompanied by nausea or vomiting. Sometimes the pain spreads to the back and can last from several minutes to several hours, it usually occurs after meals, especially after heavier and fatty foods.

In patients with problems, or symptoms due to gallstones, surgical treatment is necessary, because in 3% of these patients within a year occurs some form of complication. The most common complications are: a) acute inflammation of the gallbladder, when stone is stuck on the exit from the gall bladder and requires urgent surgery; b) choledocholithiasis (stones from the gallbladder bile entering the conduits, which can be clogged); c) cholangitis (purulent bile ducts); d) an acute inflammation of the pancreas; e) bowel obstruction by calculus (if the stone passes into the duodenum or small intestine); f) carcinoma of the gallbladder. The existence of the symptoms requiring

diagnostic tests which prove the existence of stones or changes in the gall bladder.

Routine diagnostics include: a) clinical history; b) clinical examination; c) complete laboratory tests; d) X-ray of the lungs and heart; and e) echo examination. Additional diagnostic methods are CT and ERCP.

According to the report of the US National Institute of Health, it is estimated that 6.3 million men and 14.2 million women, aged 20-74 years in the United States has calculosis of the gallbladder, due to which every year is performed about 700,000 cholecystectomy (1).

In patients with symptomatic gallstones treatment is removal of the gallbladder with stones in it. The surgery for removal of the gallbladder is called a *cholecystectomy*. It could be an urgent or planned. Surgical removal of the gallbladder is not performed because it "contains stones, but because it creates stones". In today's world and in our county the method of choice for removal of the gallbladder is considered laparoscopic cholecystectomy, which represents the "gold standard".

## 2. CASE REPORT

Male patient, aged about 40 years, admitted at the Clinic and laparoscopic surgery was performed in our department for chronic, as multiple, symptomatic gallblad-



Figure 1a, b, c. Laparoscopic cholecystectomy: surgical treatment

der calculi. Intraoperative findings showed chronically inflamed, curled gall bladder, and wall thickening. After the first postoperative day there is no content in the drain bag and it is taken out, and the patient leaves the hospital without any problems. The seventh post-operative day occurred abdominal pain, weakness and fatigue, with striking yellow skin and visible mucous membranes. Clinical, laboratory and echo determined abdomen full of fluids, so it was suspected lesion of the bile duct. Urgent revision was performed. Intraoperative was found a lesion of the common bile duct in the form of a complete interruption. Created is anastomosis through transhepatic drain according to Pradera. Early and late postoperative flow was entirely normal with normal laboratory and echofindings. Control, contrast imaging through a drain showed the orderly flow of extrahepatic bile ducts, with minimal extravasation of contrast.

Figure 1 and 2 show operative reconstruction of iatrogenic lesions of the common bile duct. The patient was monitored by surgical control findings for a longer period of time. All clinical and paraclinical findings was completely normal.



Figure 2. Postoperative RTG control examination

### 3. DISCUSSION

As father of laparoscopic cholecystectomy is considered a French surgeon Mouret, who in 1987 by laparoscopic method tourniquet artery and of the cystic duct,

and removed gallbladder removed by mini laparotomy, but he did not publish his results (1). After him, this was performed by the French doctors Dubois and Perissat in 1988. McKennan and Saye, the same year, performed the first laparoscopic cholecystectomy in the United States. In 2-4% of patients, this surgery cannot be fully performed, so in that case it is performed a conversion (traditional surgery).

National Institutes of Health of the United States passed in the 1992 conclusion that laparoscopic cholecystectomy is the treatment of choice for symptomatic cholelithiasis. The first country in South Eastern Europe which has accepted this conclusion was Croatia (1997).

After open gallbladder surgery the patient returns to work after 4 to 6 weeks. After laparoscopic surgery, the patient leaves the hospital the same day, or the day after, and may begin with everyday activities after 6-7 days. Also, due to minor trauma of the organism is reduced biological metabolic response. Hypercoagulability of blood is lower due to less stress, which contributes to minimal danger of deep vein thrombosis and pulmonary embolism. It was shown that laparoscopic cholecystectomy has significantly fewer complications than the open, but the iatrogenic lesions of the biliary tract occur twice or even three times more often. Already the first major multi-center study from Europe and the United States has found such injuries in 0.5% of patients. The number of biliary tract injury during open cholecystectomy according to various authors is up to 0.2%.

Injury of Luschkin duct is found in 33% of the patients and it is a frequent complication. The biliary duct injury can be caused by lack of surgeon experience performing laparoscopy, but the cause may be difficult operating findings, such as gangrenous, acutely inflamed or atrophic gallbladder, which is a consequence of long-term chronic inflammation. Sometimes it is difficult to understand the anatomically changed relationships and erroneous surgical evaluation results in this complication. A common injury of the anatomical relations is the connection of the cystic duct into the right hepatic duct. Mirizzi syndrome is a wide communication between infundibulum of the gallbladder and hepatic duct, so the surgeon can cut away part of hepatic duct thinking that it belongs to the gallbladder.

Cala and colleagues describe two types for classification of biliary tract injuries during laparoscopy: a) Way classification and b) Bismuth classification. According to the type and severity of biliary tract injuries were divided into 5 groups (Way classification):

- Puncture or minor lateral cutting injuries to the duct;
- Setting clips on the right or left hepatic duct, common hepatic duct or choledocus, but without cutting;
- Full cut of the common hepatic duct or choledocus;
- Completely cut of the right or left hepatic duct;
- Strictures.
- With regard to the place of stricture Bismuth and Blumgart divided them into four groups:
  - Stricture affect more than 2 cm from the confluence;
  - Stricture affect less than 2 cm from the confluence;
  - Stricture at the confluence;
  - Strictures on the left or right gall duct.

In case of stab wounds or minor cuts symptoms occur after 2 to 4 postoperative days. The consequence is the subhepatic collection of bile and regional and later diffuse peritonitis. Patients complain on pain under the right rib arc in the right shoulder, body temperature is elevated, expressed leukocytosis, hyperbilirubinemia, increased secretion of bile into the drain, 200-400 ml/24h. If emergency surgery is not performed patients may die.

That kind of injury can be solved by single resorbable sutures at the bile duct and/or by placing the T-drain. Early strictures and mistakenly placed clips on choledocus are reflected by strong biliary colic and progressive jaundice. The clips cause necrosis and wall ischemia, leading to scarring. Injuries caused by placing clips on choledocus will be resolved by repeated laparoscopy, with special emphasis on the vitality of the tissues to prevent stricture. Late strictures occur over weeks or months after surgery and cause a clinical picture of recurrent cholangitis and liver damage. To assess the injury of the bile ducts, can be used CT, MRI, ERCP, HIDA scintigraphy and percutaneous cholangiography. For sure completely cut choledocus require reconstruction by termino-terminal anastomosis with T-drain or biliodigestive anastomosis.

Short choledocus defects can be reconstructed by direct suture only if they are less than 1cm. The problem of direct suture can be tensions in suture line or poor blood supply to the bile duct anastomosis line. The tension can be reduced by mobilizing the duodenum. For defects larger than 1 cm required is biliodigestive anastomosis. The requirement for a good long-term outcome of biliodigestive anastomosis is good vitality of the bile duct tissues because if compromised, leading to biliary secretion, poor healing of the anastomosis and scarring. It is im-

portant to prepare the bile duct as shorter as possible to preserve the nutritive vessels that run along it to the right and left sides. Anastomosis is performed with removed jejunal curve according to Roux, termino-lateral, by resorbable suture 5/0. Seams are single, and by making up nodes outside the lumen.

As the choice of therapy should be considered also endoscopic choledocus drainage, setting prosthetics trough the papilla Vateri and papillotomy.

Prevention of biliary tract injuries, and thus the occurrence of enteric fistulas and recurrent cholangitis allow intraoperative cholangiography. It is important to identify and classify injury to the biliary tract and make quality primary care for each following reconstruction attempt more difficult and demanding.

#### 4. CONCLUSION

At the Department of Surgery of General Hospital in Konjic laparoscopic cholecystectomy is performed since 1999. In the beginning it was done by three trocars (European style), and later, in order to prevent complications or injury of the bile duct is performed surgery with four trocars (American style). The number of complicated procedures in our hospital does not differ from similar indicators in foreign surgical facilities.

**CONFLICT OF INTEREST: NONE DECLARED.**

#### REFERENCES

1. Čala Z. i suradnici. Laparoscopska kolecistektomija: temelji endoscopske kirurgije. Art studio Azinović, Zagreb, 2001.
2. Kapoor VK.; Bile duct injury repar-Yhen?, What?, Who?,:Journal of HBP Surgery. 2007; 14: 476-479.
3. Haney C, Pappas T. Management od Common Bile Duct Injures. Operative Technigues In General Surgery. 2008: 175-184.
4. Tornqvist B, Stromberg C, Persson G, Nilsson M. Effect of intended intraoperative cholangiography and early detection of bile duct injury on survival after cholecystectomy, population based cohort study. British Medical Journal. 2012; 345: e6457.
5. Pekoli J, Alvarez FA, Palavecino M, Intraoperative Management and Repair of Bile Duct Injures Sustained during 10,123 Laparoscopic Cholecystectomies in a High-Volume referral Centar: Journal of the American College of Surgeons. 2013 May; 216(5): 894-901.
6. Agresta F, Campanile FC, Vittoreto N. Laparoscopic Cholecystectomy, Publisher:Cham, (Switzerland): Springer, 2014.