

POST-CHOLECYSTECTOMY BILIARY LEAK AND ITS MANAGEMENT IN A TERTIARY CARE HOSPITAL OF LAHORE CITY: A CROSS SECTIONAL, DESCRIPTIVE STUDY

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Abstract

Background and Objective: Leakage of bile after open or laparoscopic cholecystectomy is rare, but if occurred, is associated with higher risk of morbidity and mortality. The objective of this study was to describe the experience of managing post-cholecystectomy biliary leak in a tertiary care hospital of Lahore, Pakistan.

Methods: In this descriptive, cross sectional study, twenty-two cases were included using purposive sampling technique. These cases presented with bile leakage after cholecystectomy (open and/or laparoscopic) over the period of 3.5 years in a surgical unit. The patients were managed on case-to-case basis using a standardized revised algorithm. All patients were managed by ultrasonography guided drainage, and laparoscopic wash with control of sepsis. Magnetic Resonance cholangiopancreatography (MRCP) was conducted to classify injury using Strasberg's classification and managed according to the injury type. Data were managed and analyzed using SPSS version 25 and described using frequency and percentages.

Results: Cases were aged between 30-60 years and out of 22 patients, twelve presented with bile leaks through drain left in-situ (55%), six presented with peritonitis with drain in-situ (27%), four patients (18%) had abdominal distension and peritonitis. Forty-one percent patients were managed by ultrasound guided drainage and in 9/22 patients laparoscopic wash and drain placement was done. In six patients, ERCP with stent was used. In 5/22 patients, hepaticojejunostomies were performed.

Conclusion: Post-cholecystectomy iatrogenic biliary leak can be managed by drain placement, abdominal wash and antibiotics. Presented algorithm will help surgeons to manage post-cholecystectomy biliary leak effectively with low risk of mortality and morbidity.

Keywords: Bile duct disease, post-operative complications, Common bile duct injuries, Biliary fistula, fistula biliary, biliary leakage, Cholecystectomy

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Cholelithiasis is prevalent globally including Pakistan.¹ Symptomatic cholelithiasis is treated with cholecystectomy (open or laparoscopic) and is most

frequently performed as an elective surgery. Although leakage of bile after cholecystectomy is rare, but if occurred, has high risk of morbidity and mortality,² and it can be prevented, if diagnosed early and treated promptly. Bile leak is due to multiple reasons, most commonly bile leaks from cystic duct stump, or from duct of Luschka, but it could be due to iatrogenic injuries to hepatic duct or common bile duct.

Bile duct or hepatic duct injury is most serious complication of open and/or laparoscopic cholecystectomy with an incidence of 0.1% and 0.3% to 0.7% respectively.³ Bile duct injury usually presents with continuous leak of bile from biliary tree and is a devastating for the surgeon. Operating surgeons face many

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challenges after this complication. Before deciding the modality of treatment, they need to classify the injury. There are different classifications in literature which help to categorize Common Bile Duct (CBD) injuries and require investigations. The management of bile duct injury is challenging for the surgeons and need clear algorithm for the guidance.⁵ There is a clear algorithm in low socioeconomic countries available in literature,⁶ and that can help the surgeons to manage iatrogenic injury after cholecystectomy.

Although we have many advanced facilities (MRCP, advanced laparoscopic equipment and ERCP) at our center, diagnosis and management of these injuries is still a challenge. We have referral from all over the Punjab province. Standardization in classification and management of iatrogenic bile duct injury is required for such patients. Our aim in this study was to describe the experience of managing post-cholecystectomy iatrogenic injury and biliary leakage using a standardized algorithm.

METHODS

This descriptive, cross-sectional study was conducted in department of surgery at Lahore General hospital (LGH), a tertiary care teaching facility in Lahore, from January 2017 to June 2020. After an approval obtained from institutional Ethical Review Board, a database containing the information about 22 cases of bile duct injury following open or laparoscopic cholecystectomy during the study period was examined to describe the extent of CBD injury or other sources of biliary leakage and its management. Based on previous experience of managing biliary leakage, a revised algorithm was developed after discussion with a team of experienced surgeons and interventional gastroenterologist (Figure 1) and this algorithm was used to manage all 22 cases. Sociodemographic characteristics (age, gender), indications of cholecystectomy, complications, presence of drain, hospital stay, whether ERCP before procedure done, drain placement and stent insertion data, conversion to open cholecystectomy were recorded on a structured proforma. Categorical data are presented as frequency with percentages.

We used SPSS version 25 to manage and analyze the data.

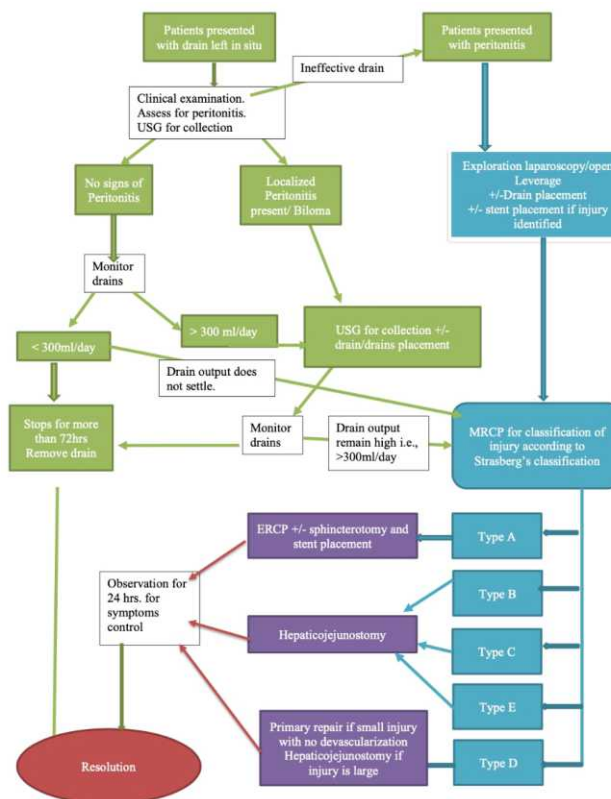


Figure 1: Protocol for management of bile leaks post cholecystectomy

RESULTS

Median age of 22 patients was 45 with age ranges between 30-60 years. There were nine (40.9%) males and 13(59.1%) females. The main indications for cholecystectomy include chronic cholecystitis (cholelithiasis) in 16 of 22 cases, whereas 4/22 had acute cholecystitis and one each were having empyema and previous obstruction of CBD. In 20 out of 22 cases, drain was in place and in 7/22 cases ERCP was done prior to surgical procedure. Pancreatitis was found in one case (Table 1).

There were two main clinical presentations of patients after cholecystectomy which were continuous bile leak from the drain left in place and/or signs and symptoms of peritonitis. For patients with peritonitis, all stable patients were managed with ultrasound (USG) guided collection and USG guided drain placement to drain collection. The patients with frank peritonitis

were managed with laparoscopic wash and drain placement or exploratory laparotomy, wash and drain placement. Daily assessment of drain/drains output were recorded.

In our setup if the drain output remained 300 or less per-day and reduced subsequently, these patients are more likely to settle without any intervention. The patients who had drain/drains output more than 300/day were planned for MRCP to see the biliary anatomy (Table 2). During laparoscopy and laparotomy wash Cystic duct stump and gallbladder fossa was inspected carefully for bile leak and documentation of injury. Two 18 Fr suction drain was left one in gall bladder fossa and other in pelvic area. MRCP was planned after monitoring the drain output and if injury remained unidentified on exploration. Definitive surgery was planned after 6 weeks which was based on finding during exploration or according to Strasberg classification done on MRCP. Eighteen had drains in the right hypochondrium and mostly presented as bile leak from the drain and/or wound site. Ten patients were presented with biliary peritonitis as 1st sign. All patients with peritonitis were preferred to wash laparoscopically. These patients only converted to open if wash was not achieved completely with laparoscopic approach due to adhesion. Six patients had their drains removed on 1st post-operative day as drain output was minimal and they developed peritonitis in next 48 hrs. The remaining patients had not drain left in place and presented on day 2, 4, 10 and 17 (Average day of presentation is 8th day). Bile leaks were settled with conservative management in 5 patients, the remaining 5 patients required surgeries for definitive procedures. The indication of surgery was continuous leak from bile duct. MRCP showed that 2 patients had class B injury, 2 had class C, one had class E according to the Strasberg classification. All 5 patients underwent laparotomy and Hepaticojejunostomies were performed (Table 2). The hepaticojejunostomies were performed on 14th day in 3 patients, at 28th day in one and 38th day in one patient. The average operative time was 182 mins (240min in 3 patients and 180 mins in two patients). Four patients were converted to open surgery due to

dense adhesion around gall bladder fossa and anatomy was not cleared. One patient required conversion due to uncontrolled bleeding from cystic duct. Of 22 patients, twenty-one patients were recovered well with no major complication and no need for HDU/ICU care. The median hospital stay was 28 days (range 7-55 days). One patient was shifted to ICU as she developed wound infection, sepsis which led to MODS, with deranged RFTs. Her sepsis was controlled and was discharged on 30th day.

Table 1: Sociodemographic characteristics of participants and indications for cholecystectomy, complications after laparoscopic surgery among patients presented with biliary leakage in a tertiary care hospital of Lahore (n=22)

Characteristics	Number	Percentage
Gender		
Male	09/22	40.1%
Female	13/22	59.1%
Indications of Laparoscopic Cholecystectomy		
Chronic Cholecystitis	16/22	72.7%
Acute cholecystitis	4/22	18.2%
Empyema	1/22	4.5%
Previous obstruction of CBD	1/22	4.5%
Complications & initial management		
Pancreatitis	1/22	4.5%
Conversion to open cholecystectomy	4/22	18.2%
Post-operative drain in place	20/22	90.9%
ERCP done before	07/22	31.8%

Table 2: Management of post-cholecystectomy biliary leak using revised surgical algorithm in a tertiary care hospital of Lahore (n=22)

Management	Number	Percentage
Ultrasound guided drainage and drain placement	9/22	40.9%
Laparoscopic wash and drain placement	9/22	40.9%
Laparotomy wash and drain placement	6/22	27.3%
MRCP	21/22	95.5%
ERCP and stenting	6/22	27.3%
ERCP and stone removal	1/22	4.5%
ERCP and sphincterotomy	1/22	4.5%
Hepaticojejunostomies	5/22	22.7%

DISCUSSION

Cholecystectomy is the procedure of choice for symptomatic gallstones. Though it has evolved over time to a day case surgery but management of biliary leak after cholecystectomy remained a challenge.⁷ However basic principle behind this management is control of sepsis by drainage of bile. Failing to control spillage can result in sepsis and biliary peritonitis.

Recognition of peritonitis and washing the abdomen and drain placement is main protocol of management followed by MRCP if the leak persists. MRCP findings can classify the type of injury and helps to decide to go for ERCP or definitive surgery. ERCP has both diagnostic and therapeutic role. Many techniques can be used to reduce the pressure in the bile duct and to decrease the leak resulting in the healing of injury. This algorithm supports use of internal biliary stents for continues leak and for type A injuries according to Strasberg's classification. Few studies advocate use of ERCP without MRCP,^{8,9} but many advocate for use of MRCP followed by ERCP.¹⁰ There is lot of debate for use of ERCP alone or MRCP followed by ERCP.¹¹ MRCP will help to identify the type of biliary injury, and one can re-operate with definitive plan in mind.¹² MRCP also guide if ERCP is required for treatment of just one should plan for surgery. ERCP and stent placement plays an important role as adjunct to laparoscopy for control of sepsis by stent placement and it will also accelerate the recovery.

ERCP is not used routinely for diagnostic or therapeutic purposes in many hospitals of Pakistan due to lack of training and non-availability of this facility.¹³ For this reason, we also advocate early referrals to tertiary care / dedicated hepatobiliary center for management of such injuries.

Exploration laparoscopy for drain placement and washout of bile is preferred over laparotomy in this study. Types of injuries identified on MRCP was the only indication for the surgery. Successful ERCP and stent placement has changed the indication of surgery.¹⁴ Interestingly, there were small number of patients in both groups in which placement of drain did not help to control the biliary peritonitis. The reason behind

was blockage of the drain or the early removal of the drain. On laparoscopy we tried to identify the type of injury, but we failed. Many studies advocate that magnificent view of laparoscopy helped in identification of injuries,^{15,16} but this study has different results which might be due to control of bile leaks with help of ERCP and stent placement. The leak was from Cystic duct, CBD, accessory duct or from liver bed which is comparable to other studies.

The management of bile leak and/or peritonitis in a structured step wide approach is beneficial in our experience. It also required availability and expertise of ERCP and MRCP 24/7 in hospital. If these are not available, then we advise to follow the conventional approach to manage these patients or preferably we advise to refer these patients to the centers where this expertise is available. The only mortality in this study was due to sever sepsis and the key point of the study is to control the sepsis, ensuring the control of bile leak. Main limitations of this study are its design, sample size and generalizability. Results from single center might not be applicable to wider population, however, the experience may be replicated and further studies may be planned with larger sample size and collaborating with other centers.

CONCLUSION

Drain placement and wash with laparoscopic technique is best method to control sepsis due to bile leaks after cholecystectomy at initial stages. Outcome depends upon on timings of repair of the injury, type of CBD injury, extent of injury and duration of injury. Following the revised algorithm presented in this study will reduce the hospital stay and will also improve the outcome in terms of reducing mortality and morbidity.

Ethical Approval:

The ethical Approval for this study was obtained from PGMI/Ameer-ud-Din Medical College, Lahore. (Reference No. 00-39-17)

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