

Evaluation of Intraoperative Findings in Laparoscopic Cholecystectomy to Prevent Biliary Leakage as Complication

Brijesh Singh Kirar¹, Mukesh Kumar Dhurvey², Shailendra Singh Nargesh³, Bukke Anjineyulu Naik⁴

¹Senior Resident, MS (General Surgery), Department of Surgery, G.R. Medical College & JAH, Gwalior (M.P.)

²MS (General Surgery), Department of Surgery, G.R. Medical College & JAH, Gwalior (M.P.)

³Senior Resident, MS (General Surgery), Department of Surgery, G.R. Medical College & JAH, Gwalior (M.P.)

⁴Senior Resident, MS (General Surgery), Department of Surgery, G.R. Medical College & JAH, Gwalior (M.P.)

Received: 10-04-2023 / Revised: 19-05-2023 / Accepted: 30-05-2023

Corresponding author: Dr. Bukke Anjineyulu Naik

Conflict of interest: Nil

Abstract:

Introduction: Minimally invasive procedure is the accepted technique for the treatment of gallbladder disease. Though minimally invasive, there is still a risk for complications. Serious complications were found to occur in 2.6% of cases and include bile duct injury (including bile leaks), bleeding, and bowel injury. Surgeons must be aware of the Safe Cholecystectomy Task Force guidelines that promote the safety and success of laparoscopic cholecystectomy while minimizing the risk for bile duct injuries. It is also imperative that when a BDI does occur, clinicians recognize the corresponding symptoms and promptly diagnose and treat the source of the leak to prevent further morbidities. The decision on how to treat the leak depends on factors such as the severity and type of injury (defined by the Strasberg classification). In this study we assess the intra operative notes to predict difficult Laparoscopic Cholecystectomy and association with biliary leakage. Studies have also supported successful outcomes with early referral to a tertiary biliary surgery center with a hepatobiliary specialist.

Methods: This study was conducted on 200 consecutive patients admitted in J.A. group of hospital and G.R. Medical College, Gwalior during the period of September 2018 to September 2021. Out of 05 patients developed significant biliary leakage.

Result: The factors showing definitive association with intraoperative findings dense adhesion followed by frozen calots triangle. Drain placement failed to show significant association to predict biliary leakage after Cholecystectomy however early diagnosis is possible and also helpful to manage low output fistula.

Conclusion: Biliary leakage is dreaded complication of gallbladder removal either during laparoscopic or open Cholecystectomy however chances are more in lap cholecystectomy either due to difficulty to identify intra operative anatomy clearly because of dense adhesion, short cystic duct, aberrant vascular, Biliary anomaly.

Keywords: Biliary leak, Laparoscopic cholecystectomy, Gall bladder.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Gallstone is common disease encountered in emergency as well as routine OPD in general surgery department. Minimally invasive procedure is the accepted technique for the treatment of gallbladder disease due to the low cost, reduced length of hospital stay, fast recovery, and patient satisfaction. Though minimally invasive, there is still a risk for complications.

Studies have reported that these occur more frequently in those with risk factors that include age > 65 years, acute cholecystitis, previous cholecystitis, preoperative endoscopic retrograde cholangiopancreatography (ERCP), and conversion to open cholecystectomy [1].

Serious complications were found to occur in 2.6% of cases and include bile duct injury (including bile leaks), bleeding, and bowel injury [2]. Specifically, the incidence of bile duct injury following laparoscopic cholecystectomy has been estimated to be 0.15-0.3% of all cases [3]. Although a bile duct injury (BDI) is uncommon, it is preventable. Surgeons must be aware of the Safe Cholecystectomy Task Force guidelines that promote the safety and success of laparoscopic cholecystectomy while minimizing the risk for bile duct injuries. It is also imperative that when a BDI does occur, clinicians recognize the corresponding symptoms and promptly diagnose and treat the source of the leak to prevent further morbidities. Currently, there is no official clinical practice guideline algorithm for the treatment of bile leak. The decision on how to treat the leak depends on factors such as the severity and type of injury (defined by the Strasberg classification)[4]

. Studies have also supported successful outcomes with early referral to a tertiary biliary surgery center with a hepato biliary specialist [5,6]. In this review, we aim to discuss the factors to consider that should guide decision-making and encourage early

referral to a hepato biliary specialist for the management of bile leaks.

Our Aim of the study is to find out the intra operative findings to predict difficult cholecystectomy than we can reduce the incidence of biliary leakage and alert for timely conversion to open cholecystectomy.

Aims and Objectives

To study the intra operative findings to predict difficult laparoscopic cholecystectomy and biliary Leakage

Material and Methods

This study was conducted on 200 consecutive patients admitted in Department of General Surgery J.A. group of hospital and G. R. Medical College, Gwalior during the period of September 2018 to September 2021 . Out of which 5 patients developed significant biliary leakage.

Study Design: Retrospective observational study

Inclusion Criteria

We have included available patient Intraoperative notes to significant biliary leakage in following points Normal Anatomy, abnormal finding including difficult calots triangle, Dense adhesion.

Exclusion Criteria

We have exclude those patients case record they underwent for cholecystectomy as a part of some primary operation like Whipple's operation, biliary-enteric anastomosis & where comparable Intraoperative Findings not available.

Statistical Analysis

All Statistical calculations were done with the help of Chi-Square test with degree of significance <0.5% with SPSS software version 22.0

Results were tabulated and represented by suitable graphs and compared with other similar studies.

Observation & Results

Following observations were made :-

All the patients included in this study underwent LC and patients with presence of one or more of the below mentioned intraoperative finding were considered to have undergone difficult LC and absence of all the factors was considered to be uneventful LC. Following are the factors which were taken in consideration intraoperatively:

1. Anatomy of Calot's triangle: In the studied sample, 29 patients were found

to have dense adhesions at Calot's triangle causing difficulty in dissection.

2. Dense adhesion: in the studied sample, Dense adhesion occurred in 28 patients intraoperatively.
3. CBD Diameter: Dilated CBD was found in 08 patients of all cases.

Vascular injury/Biliary injury: Vascular injury/Biliary injury was found in 27 patients leading to a difficult procedure which included short cystic duct (18), Tortuous cystic duct (06), aberrant vessels (03) in out of 21 patients. In all patients of biliary leakage 4 out of 5 had abnormal anatomy which signify that correlation with biliary leakage.

Table 1: Frequency of Intra-operative Events leading to Difficult Procedure

Intraoperative findings which made the procedure difficult	Frequency of occurrence	Percentage	Biliary Leakage Patients	Percentage
Difficult Calot's triangle	29	14.5	04	80
Dense adhesion	28	14	04	80
CBD Dilated	08	04	01	20
Vascular abnormality/Biliary abnormality	23	11.5	04	80
Normal anatomy	160	80	01	20

Vascular and biliary injury includes short cystic duct, tortuous cystic duct, aberrant vessels P value of this observation is 0.0000012(<0.05) which indicate that abnormal biliary or arterial anatomy has significant association.

Biliary /Arterial Anomalies

Normal anatomy-0, Short cystic duct-1, Tortuous cystic duct-2, Aberrant vessels-3, Thickened bladder-4. Out of the total 200 patients in the study, 47 were used clip

during surgery and 153 were used suture during surgery. out of 153, 149 were used silk and 04 were used vicryl.

In patients of biliary leakage 04 were used silk, 01 were used clip and 01 were used vicryl. data signify that vicryl and clip have more chances of biliary leakage than silk suture used to ligate cystic duct during surgery. P value is 0.09(>0.05) which signify no significant association exist between any method used for ligation.

Table 2: Material used for cystic duct ligation during surgery

Material used		Number of Patients	Percentage	Biliary leakage patients	Percentage
Suture	Silk	149	74.5	02	40
	Vicryl	04	2	00	00
Clip		47	23.5	03	60

Material used ; Clip -0 Silk -1, Vicryl -2

Out of the total 200 patients in the study, 161 (80.5%) were used abdominal drain in the surgery. In our study, all patients of biliary leakage drain was used. No. patients was identified as biliary leak through our inclusion criteria in which drain was not used. P value is 0.5 (>0.05) which indicate no significant association found in this study.

Table 3: No. of cases in which drain used on not

	Number of Patients	Percentage	Biliary leakage patients	Percentage
Drain	161	80.5%	05	2.5
Without drain	39	19.5%	00	00

Drain used ; Yes-0 , No-1

All the patients included in this study underwent LC and patients with presence of one or more of the below mentioned intraoperative findings were considered to have undergone difficult LC and absence of all the factors was considered to be uneventful LC.

Discussion

This current study was conducted to assess the intra operative and postoperative complications of patients undergoing laparoscopic cholecystectomy. Total 200 patients undergoing laparoscopic cholecystectomy were included in this study. Majority of the study people (30%) were in the age group of 35-50 years. In this study, the commonest intra operative complications was trocar site bleeding (8%), followed by 7% had liver bed injury, 5% had bile leakage from GB, 2% had bleeding from calots, 2% had bile duct injury. Familiar results were found in the study of Agarwal et al [7] where the most frequent intra operative complication was

trocar site bleeding and liver bed injury, 7%, followed by bile leakage from gallbladder 6%, bleeding from calots triangle in 4% and spilled gallstones in 2% cases. In our study, there was small sample size and absence of control for comparison. Study population was selected from one center in Gwalior, so may not represent wider population. The sampling was retrospective and there was no random

allocation, so there was risk of selection bias.

Conclusion

This study was done to investigate the association of certain intra operative findings to predict biliary leakage. In our study we found that most common findings was dense adhesion followed by frozen calots triangle. Drain placement and method of ligation of cystic duct was found to be non-significant in our study.

References

1. Zhong H, Hao TT, Chen Y, Luo F. Unexpected gallbladder cancer during or after laparoscopic cholecystectomy: risk factors and experience of diagnosis and treatment of 22 cases. *Am Surg*. 2019;85:671-5.
2. Bafort C, Beebejaun Y, Tomassetti C, Bosteels J, Duffy JM. Laparoscopic surgery for endometriosis. *Cochrane Database Syst Rev*. 2020; 10: CD011031.
3. Mouret G. From the first laparoscopic cholecystectomy to the frontiers of laparoscopic surgery: the future perspectives. *Dig Surg*. 1991;8:124-5.
4. Kitano S, Matsumoto T, Aramaki M. Laparoscopic cholecystectomy for acute cholecystitis. *J Hepatobil Pancreat Surg*. 2002;9(5):534-7.
5. Cuschieri A. Laparoscopic cholecystectomy. *J R Coll Surg Edinb*. 1999; 44(3):187-92.

6. Sain AH. Laparoscopic cholecystectomy is the current “gold standard” for the treatment of gallstone disease. Ann Surg. 1996;224(5):689-90.
7. Agarwal S, Joshi AD. Perioperative complications of laparoscopic cholecystectomy: a cross-sectional observational study. Int Surg J. 2020; 7(5):1490-5.