



## **Evaluation of the Bleeding Complications in Laparoscopic Cholecystectomy in a Tertiary Care Hospital: A Cross-Sectional Study**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Objective:** To determine the frequency of various sources of bleeding in laparoscopic cholecystectomy with special preference to gallbladder bed excluding port site.

**Methods:** This cross-sectional study was consisted of 163 patients admitted through the outpatient department from Peoples Medical College Hospital Nawabshah. Ultrasound of abdomen was done as diagnostic modality and for assessment of gallstone disease. Finally the cases of gallstone were operated through laparoscopic cholecystectomy procedure and observed for sources of bleeding.

**Results:** Out of 163 patients included in this study 138(84.7%) were female and 25(15.3%)

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patients were male; with female to male ratio of 5.52:1. The mean age was 41.85±7.83 years. Common sources of bleeding in laparoscopic cholecystectomy from liver bed side were 44(27%) cases followed by cystic artery in 17(10.4%) cases, hepatic artery and mesenteric vessel in 1(0.6%) case was observed.

**Conclusion:** Bleeding during laparoscopic cholecystectomy are almost equally common and can prove to be lethal if not identified and managed during the operation. Good surgical technique, awareness and early recognition and management of such cases are keys to success when dealing with this problem.

*Keywords: Cholecystectomy; laparoscopy; source of bleeding.*

## 1. INTRODUCTION

Gall bladder disease is one of the most common" digestive disorders seen by physicians [1]. Approximately 10 -15 % of the adult population have gallstones and it is rare below the age of 10 years [2]. The prevalence is higher in women in association with multiple pregnancies, obesity and rapid weight loss as well as in older patients [3,4] Laparoscopic cholecystectomy (LC) is one of the most frequently performed general surgical procedures [5]. This high rate of surgery reflects the great impact of gallstone disease (GD) on public health. Gallstones are common in the Western world with a prevalence of up to 15%. In the US, 600,000 patients undergo cholecystectomy each year at an estimated annual cost of 5 billion dollar [6]. Being the most common disease of the digestive system leading to hospitalization in the Western world, GD represents a major healthcare problem and poses a considerable financial burden on society [7]. Still, according to studies, some 10 to 30% of all cholecystectomies are performed using open technique, particularly in elderly population [8] and in acute cholecystitis [9]. In addition, the open technique is still needed, when the laparoscopic operation is impossible to completed safely and the conversion to open procedure is required. According to the literature, current conversion rate varies between 5 and 10% [10,11]. The majority of conversions are performed because of obscure anatomy (difficult cholecystitis) or bleeding complications. Laparoscopic cholecystectomy has vascular injuries rate of 0.25-0.5%, with major morbidity. Classical triad pain, jaundice and hemobilia is seen in 20-30% of them [12].

The incidence of bleeding complications requiring transfusion or reoperation has been reported to be relatively rare, occurring in 0.1% in patients undergoing LC. Focus in the literature, however, has been on biliary complications of LC. Yet, major vascular complications, even

though rare, are also serious complications of laparoscopy. In addition, bleeding remains a frequent reason for conversion [13]. The reported incidence of uncontrollable bleeding in LC can be up to 2% (reported range, 0.03% to 10%), and can occur at any time during LC [14].

In a multi-institutional collective series of 77,704 laparoscopic cholecystectomies the incidence of hepatic artery injury was 12% [15]. Sources of bleeding in laparoscopic cholecystectomy according different studies as 88% gallbladder bed [16] 7.4% cystic arteries [17] mesenteric vessel injuries 7.3% [18]. Bleeding complication account for up to one third of all major complications seen in LC and are the second most common cause of death in patients undergoing the procedure anesthesia related complications [7]. The purpose of study determines the frequency of various sources of bleeding in laparoscopic cholecystectomy with special preference to gallbladder bed excluding port site.

## 2. MATERIALS AND METHODS

This cross sectional study consisted of 163 patients, Patients of either gender having age between 30 to 55 years having cholecystitis with cholelithiasis diagnosed on basis of presence of murphy's sign, and confirm by the Ultrasound showing echogenic shadow and Gallbladder wall thickness of more than 3mm were included in the study.

While patients with HBV or HCV +ve, Diagnosed on serology, Patients below age of 30 years or above age 55yrs, Patients with severe co-morbidity i.e. decompensate cardio respiratory function, Patients with carcinoma of gall bladder conformed by CT scan abdomen, Patients with acute pancreatitis, conformed by raised serum amylase level >1200meq/ml or Patients with CBD stones conformed by ultrasound abdomen were excluded from the study.

## 2.1 Data Collection

The data collection was started with patients presenting to our surgical OPD with complain of pain in right hypochondrium from more than six weeks diagnosed on basis of presence of murphy's sign, and confirm by the Ultrasound showing echogenic shadow and gallbladder wall thickness of more than 3mm.

Data were collected on demographic variables like name, age, gender and duration of illness. Sites of bleeding (from cystic artery, gall bladder bed, middle hepatic vein and from mesentery), duration of operation and amount of bleeding was noted as no of soaked gauze. (1 soaked gauze = 10 cc of blood).

## 2.2 Data Analysis

All data was entered and analyzed in SPSS version 21. The mean and standard deviation (Mean ± SD) was expressed for continuous variables like age, duration of illness, Duration of operation and Amount of blood loss. Categorical variables like gender and Sources of bleeding in LC were expressed in frequencies and percentage. To evaluate the effect modification,

age, gender, duration of illness, and amount of bleeding and operative time were stratified followed by application of chi-square with a p value ≤ 0.05 taken as significant.

## 3. RESULTS

The 163 cases of gallstone were operated through laparoscopic cholecystectomy procedure. Out of 163 patients included in this study 138(84.7%) were female and 25(15.3%) patients were male. The age was ranging from a minimum of 30 year to 55 years. The mean age was 41.85±7.83 years (Table 1).

Operative time range observed from 30 to 55 minutes with mean 37.45±6.37 minutes was observed. Amount of blood loss 5 to 30 cc with mean 8.93±6.83 was observed during surgery (Table 2).

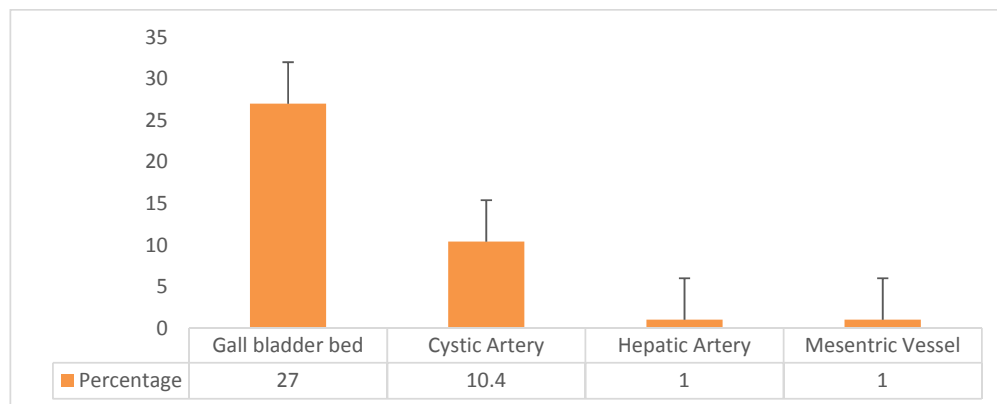
Common sources of bleeding in laparoscopic cholecystectomy from liver bed side 44(27%) cases was observed followed by cystic artery in 17(10.4%) cases, hepatic artery and mesenteric vessel 1(0.6%) case in each was observed (Fig. 1).

**Table 1. Gender distribution of the patients**

Gender	No. of patients	Percentage
Male	25	15.3%
Female	138	84.7%

**Table 2. Duration of surgery and amount of blood loss**

Variable	Minimum	Maximum	Mean	Std deviation
Duration of Surgery (Min)	30	55	37.45	6.37
Amount of Blood Loss (cc)	5	30	8.93	6.83



**Fig. 1. Bleeding sources in laparoscopic cholecystectomy in percentage (n=168)**

#### 4. DISCUSSION

Gallstone disease is a major problem worldwide, particularly in adult population. Its incidence shows a considerable geographical and regional variation [19]. In the developing countries like Pakistan as well where first LC was performed in 1971 [20]. The advantages of minimal invasive surgery have established laparoscopic cholecystectomy as the method of choice in the management of symptomatic cholelithiasis. Progress in materials and techniques over the past fifteen years resulted in gradually improved results [21]. However, major complications may still account for morbidity as high as 2.9% [22].

Out of 163 patients included in this study 138(84.7%) were female and 25(15.3%) patients were male; with female to male ratio of 5.52:1. However the male to female ratio given by Viste. A was 1:2.35 and Munira Ali Elmansouri is 1:5 which is almost be similar to the present study [23, 24].

The technique of laparoscopic cholecystectomy has not undergone any major change over the past recent years, that is, until the time single port surgery appeared. Statistical analysis of a large number of operations creates the possibility to study the learning curve of the department, of the residents and of the experienced surgeons and to investigate the effects which could impact operating time. The findings of such investigations could be of use not only in enhancing the efficiency of education of the residents, but also in improving the safety of operative procedures [25]. The operative time in our series was observed. The mean operative time for laparoscopic cholecystectomy was  $37.45 \pm 6.37$  minutes with range 30 to 55 minutes. The mean operative time given by Khan S and Oonwala ZG [26] was  $60.5 \pm 17.5$  for OC and  $62 \pm 15.2$  minutes for LC group and Siddiqui K [27] is 50 minutes, the range varying from 30 to 110 minutes.

Bleeding in LC can be encountered intra-operatively or in the postoperative period. Intra-operative bleeding usually falls into one of the following four patterns: vessel injury, slippage of clips/ ligatures of the cystic artery, liver bed bleeding and miscellaneous [28]. However in our study in 44 (27%) patients were bleeding through gallbladder bed while in the study of Malik AM [29] reported in his study 11(1.05%) cases bleeding through gallbladder bed.

Cystic artery bleeding is a troublesome complication during laparoscopic cholecystectomy, which increases the rate of conversion to open surgery [30]. If surgery is performed incorrectly, injury to the extrahepatic bile duct or intraabdominal organs is inevitable. The reported incidence of conversion to open surgery because of blood vessel injuries is approximately 0%-1.9% during laparoscopic cholecystectomy and its mortality is about 0.02%<sup>98</sup>. Safe laparoscopic cholecystectomy demands a good knowledge of the anatomy of the cystic artery and its variations. The cystic artery has many possible origins, with the right hepatic artery being the most common [31]. In our study bleeding through cystic artery occurred in 17(10.4%) patients.

Dissection during LC, especially within the Calot's triangle, can also lead to a significant bleed if the right hepatic artery or the portal vein is injured. This can happen especially when the anatomy is distorted or unrecognized, and when there is persistence in using sharp dissection in a difficult Calot's. The right hepatic artery is more commonly injured, but the portal vein can also be injured, leading to significant bleeding and the risk of biliary injury because of blind attempts to control the bleeding. Not being able to recognize the extent of injury and delaying conversion in such a situation definitely contributes to increasing the morbidity and mortality of the procedure [32]. In our study bleeding from hepatic artery was observed in 1(0.6%) case. While international studies reported 0.6% hepatic artery bleed during laparoscopic cholecystectomy.

#### 5. CONCLUSION

Bleeding during laparoscopic cholecystectomy are almost equally common and can prove to be lethal if not identified and managed during the operation. Patience and low threshold for conversion in difficult cases can substantially decrease morbidity. Good surgical technique, awareness and early recognition and management of such cases are keys to success when dealing with this problem.

#### CONSENT

These patients were enrolled after taking valid written consent from patients or their immediate attendant.

## ETHICAL APPROVAL

Study was approved from Research Ethics Committee of People's University of Medical and Health Sciences for Women (PUMHSW), Nawabshah, Sindh, Pakistan.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

- Flowers JL, Bailey RW, Scovill WA, Zucker KA. The Balrnc e experience with laparoscopic management of acute cholecystitis. *Am J Surg.* 1991;161:388-392.
- National Institute of Health Consensus Conference. Statement of gall stones and laparoscopic cholecystectomy. *Am J Surg.* 1993;165:390-6.
- Portincasa P, Moschetta A, Palasciano G. Cholesterol gallstone disease. *Lancet.* 2006;368:230–9.
- Center SA. Diseases of the gallbladder and biliary tree. *Vet Clin North Am Small Anim Pract.* 2009;39(3):543-98.
- Dolan JP, Diggs BS, Sheppard BC, Hunter JG. The national mortality burden and significant factors associated with open and laparoscopic cholecystectomy: 1997–2006. *J Gastrointest Surg.* 2009;13:2292–301.
- Keus F, de Jong JAF, Gooszen HG, van Laarhoven CJHM. Laparoscopic versus open cholecystectomy for patients with symptomatic cholecystolithiasis. *Cochrane Database Syst Rev.* 2006;4(4):CD006231.
- Nuzzo G, Giuliante F, Giovannini I, Ardito F, D'Acapito F, Vellone M, et al. Bile duct injury during laparoscopic cholecystectomy: Results of an Italian national survey on 56 591 cholecystectomies. *Arch Surg.* 2005;140:986–92.
- Saia M, Mantoan D, Buja A, Bertoncetto C, Baldovin T, Callegaro G, et al. Time trend and variability of open versus laparoscopic cholecystectomy in patients with symptomatic gallstone disease. *Surg Endosc.* 2013;27:3254–61.
- Rosenmüller M, Haapamäki MM, Nordin P, Stenlund H, Nilsson E. Cholecystectomy in Sweden 2000–2003: A nationwide study on procedures, patient characteristics, and mortality. *BMC Gastroenterol.* 2007;7:35.
- Ballal M, David G, Willmott S, Corless DJ, Deakin M, Slavin JP. Conversion after laparoscopic cholecystectomy in England. *Surg Endosc.* 2009;23:2338–44.
- Harboe KM, Bardram L. The quality of cholecystectomy in Denmark: Outcome and risk factors for 20,307 patients from the national database. *Surg Endosc.* 2011;25:1630–41.
- N Panda, M Narasimhan, A Gunaraj, R Ardhanari laparoscopic management of post-cholecystectomy sectoral artery pseudoaneurysm. *J Minim Access Surg.* 2014;10(1):37–9.
- Lengyel BI, Azagury D, Varban O, Panizales MT, Steinberg J, Brooks DC, et al. Laparoscopic cholecystectomy after a quarter century: Why do we still convert? *Surg Endosc.* 2012;26:508–13.
- Lengyel BI, Azagury D, Varban O, Panizales MT, Steinberg J, Brooks DC, et al. Laparoscopic cholecystectomy after a quarter century: Why do we still convert? *Surg Endosc.* 2012;26:508–13.
- Ball CG, MacLean AR, Kirkpatrick AW, Bathe OF, Sutherland F, Debru E, Dixon E. Hepatic vein injury during laparoscopic cholecystectomy: the unappreciated proximity of the middle hepatic vein to the gallbladder bed. *J Gastrointest Surg.* 2006;10(8):1151-5.
- Suzaki M, Akaishi S, Rikiyama T, Rohman MM, Matsuno, S. Laparoscopic cholecystectomy, Calot's triangle, and variations in cystic arterial supply. *Surg. Endos.* 2000;14:141-44.
- Hindma NM, Kan S, Parikh MS. Common postoperative findings unique to laparoscopic surgery. *RadioGraphics.* 2014;34:119–138.
- Phillips PA, Amaral JF. Abdominal access complications in laparoscopic surgery. *J Am Coll Surg.* 2001;192:525–36.
- Mirza MR, Wasty WH, Habib L, Jaleel F, Saria MS, Sarwar M. An audit of cholecystectomy. *Pakistan Journal of Surgery.* 2007;23(2):104-08.
- Iqbal J, Ahmed B, Iqbal Q, Rashid A. Laparoscopic V/S open cholecystectomy morbidity comparison. *Professional Med J.* 2002;9(3):226-35.
- Marakis G, Pavlidis TE, Aimoniotou E, Ballas K, Psarras K, Karvounaris D, et al. Major Complications During Laparoscopic

- Cholecystectomy. Internet J Surg. 2006;8(1):88-94.
22. Shamiyeh A, Wayand W. Laparoscopic cholecystectomy: Early and late complications and their treatment. Langenbecks Arch Surg 2004;389:164-171.
  23. Viste A, Horn A, Øvrebø K, Christensen B, Angelsen JH, Hoem D. Bile duct injuries following laparoscopic cholecystectomy. Scandinavian Journal of Surgery. 2015;104(4):233-7.
  24. Elmansouri MA, Dugani AM, Adala SA. The effects of preoperative pregabalin administration on postoperative pain on Libyan patients undergoing laparoscopic cholecystectomy. Libyan International Medical University Journal. 2018;3(2):49.
  25. Lukovich P, Zsirka A, Harsanyi L. Changes in the operating time of laparoscopic cholecystectomy of the surgeons and novices between 1994–2012. Chirurgia (Bucur). 2014;109(5):639-43.
  26. Khanna R, Chansuria R, Kumar M, Shukla HS. Histological changes in gallbladder due to stone disease. Indian Journal of surgery. 2006;68(4):201-04.
  27. Mendez-Sanchez N, Chavez-Tapia NC, Uribe1 M. Pregnancy and gallbladder disease. Annals of Hepatology. 2006;5(3):227-230.
  28. Suuronen S, Kivivuori A, Tuimala J, Paajanen H. Bleeding complications in cholecystectomy: A register study of over 22 000 cholecystectomies in Finland. BMC surgery. 2015;15(1):97.
  29. Malik AM, Laghari AA, Mallah Q, Hashmi F, Sheikh U, Talpur KAH. Extra-biliary complications during laparoscopic cholecystectomy: How serious is the problem?. J Minim Access Surg. 2008;4(1):5–8.
  30. Ding YM, Wang B, Wang WX, Wang P, Yan JS. New classification of the anatomic variations of cystic artery during laparoscopic cholecystectomy. World J Gastroenterol. 2007;14;13(42): 5629-5634.
  31. Chen TH, Shyu JF, Chen CH, Ma KH, Wu CW, Lui WY, Liu JC. Variations of the cystic artery in Chinese adults. Surg Laparosc Endosc Percutan Tech. 2000;10:154-157.
  32. Tzovaras G, Dervenis C. Vascular injuries in laparoscopic cholecystectomy: An underestimated problem. Dig Surg. 2006;23:370–4.

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