Complications of laparoscopic cholecystectomy

Tariq E. Al-aubaidi MBChB, FICMS

Summary:

Background: cholecystectomy is one of the most frequently performed operations. Open cholecystectomy has been the gold standard for over 100 years .laparoscopic cholecystectomy was introduced in 1980s.

Patient and methods: Two hundred patients admitted to first surgical unit in Baghdad teaching hospital from first May 2007- first May 2009 with gall stone disease both symptomatic and asymptomatic, of both genders and any age were evaluated by history, examination and investigations and data was collected.

Results: Two hundred patients underwent LC in the study period. 181(90.5%)were females and 19(9.5%)were males. The most common age group was between 21-40 years (55%), bleeding was the commonest complication, occurring from trocar site in 11(5.5%) cases, vascular injury in Calot's triangle in 9(4.5%) cases and liver bed in 23(11.5%) cases. Spilled gall stones occurred in 32(16%) cases, biliary leak in 7(3.5%) cases including common bile duct injury in one case. Port site infection was seen in 11(5.5%). There was no bowel injury or port site hernia and there was no mortality.

Conclusion: LC is a safe and effective procedure in almost all patients with cholelithiasis. Good training and dealing with the complications makes this procedure with good results and less complication.

Keywords: laparoscopy, cholecystectomy, complications.

Fac Med Baghdad 2009; Vol. 51, No. 4
Received Aug. 2009
Accepted Nov. 2009

Introduction:

laparoscopic cholecystectomy (LC) has revolutionized minimally invasive procedure(1,2,3).Decreased postoperative pain, earlier oral intake, shorter hospital stay, early resumption of normal activity and improved cosmoses have been well recognized after LC(4,5,6). A significant reduction in the incidence of wound complications and post-operative ileus has been documented in patients undergoing LC (7, 8). So LC has replaced open cholecystectomy in the treatment of cholecystolithiasis. It is now considered the first option in treating benign gall bladder diseases (9, 10). The risk of intraoperative injury during LC is higher than open cholecystectomy (11, 12). The intra-operative complications of LC like bowel and vascular injury, biliary leak and bile duct injuries decreased with passage of time, because of increased experience of the surgeons, popularity of the procedure and introductions of new instruments. This study presents two years experience of LC with the aim to evaluate the complications of LC in cholelithiasis both symptomatic and asymptomatic.

Materials and methods:

This prospective study was carried out in the first surgical unit in Baghdad teaching hospital from first May 2007 to first May 2009;

data was collected including history, examination findings, investigations, operative techniques and procedures, complications and their management. All 200 patients undergoing LC were included. Pre-operative prophylactic antibiotics were given to all patients in form of 3rd generation cephalosporin (cefotaxime 1 g) and metronidazole 500 mg intravenously. Mainly four ports entry procedure was adopted while three ports approach was done only in a few cases. One port was made below umbilicus for the telescope and camera, the other port was made in the subxiphoid slightly to the right for dissection in Calot's triangle, the third port was along the mid clavicular line below the level of the gall bladder, and because the level of the gall bladder varies from patient to patient , the placement of this port should not be decided on until the gall bladder is visualized. The fourth port, below the ribs along the right anterior axillary line for holding the fundus of gall bladder as this may obscure the dissection. Drain was inserted through the right sided port where ooze was suspected in dissecting area or in difficult cases or at the site of hematoma or bile leak from perforated gall bladder. The average operation time was 55 minutes (range between 80-30). Two other doses of injectable antibiotics (mentioned above) were given till the next morning. Patients were mobilized on the same evening while they were discharged home in the next morning or in the second day with advice for follow up visit after one week to assess the patient for complications.

**Dept. of Surgery /College of Medicine / University of Baghdad.*

Results:

A total of 200 patients had LC during the study period. Majority of the patients 110 (55%) were aged between 21-40 years. 75 (37.5%) were in the age 41-60 years while 3 (1.5%) patients were below 20 years and 12 (6%) patients had age more than 60years. 181 patients ((90.5%) were females and 19 patients (9.5%) were males. Pre-operative investigations were done in all cases including hemoglobin, blood group, blood sugar, blood urea, chest X-ray and ECG. Liver function test were performed in (30) (15%) patients that looked jaundiced or they have a history of passing tea color urine. Ultrasonography was done in all 200 (100%) cases while CT-Scan was done in (11) (5.5%) patients due to doubtful mass in the epigasterium. ERCP was done in (8) (4%) patients who have clinical jaundice or deranged liver function tests. MRCP was performed only in one patient (0.5%) and was done post-operatively due to common bile duct injury. Gall bladder was sent for histopathology in (142) patients (71%). (123) (86.61%) patients were reported as chronic cholecystitis, (18) (12.67%) patients as acute cholecystitis and one patient (1.42%) was reported as adenocarcinoma of the gall bladder. Regarding the complications, bleeding during the procedure was the commonest complication, bleeding from the trocar site occurred in (11) (5.5%) patients, (8) of these patients were controlled with pressure alone and in (2) patients using diathermy and in (1) patient needs enlarging of the port site and ligation of the vessel, bleeding from vascular injury in Calot's triangle in (9) (4.5%) patients and was controlled with clip application while in (3) patients were converted to open surgery, and bleeding from liver bed in (23) (11.5%) patients was controlled with diathermy. The total number of bleeding was 43 patients (21.5%). Spilled gall stones was the second most common complication occurred in (32) (16%) patients where maximum number of stones recovered during the procedure. Port site infection was reported in (11) (5.5%) patients while patients with biliary leak (from the cystic duct or from the injury to biliary tree) occurred in (7) (3.5%) patients and in (5) patients of them stopped spontaneously on 5^{th} day while in (2) patients needed intervention with T-tube and the other with Roux en Y hepaticojejunostomy. Bowel injury or port site hernia was not reported in our study. (8) (4%) patients out of 200 cases were the procedure converted to open surgery due to adhesion of the gall bladder in (3) patients and in other (3) patients due to bleeding during the procedure which was uncontrolled with conventional methods and (2) patients due to distorted anatomy. No mortality was reported in our study. These complications were shown in table 1.

Table (1)

complications	Number of patients	percentage
Bleeding trocar site	11	5.5
Vascular injury	9	4.5
Liver bed bleeding	23	11.5
Spilled gall stones	32	16
Biliary leak	7	3.5
Port site infection	11	5.5
CBD injury	2	1
Conversion to open	8	4
Bowel injury	0	0
Port site hernia	0	0
mortality	0	0

Discussion:

LC is now the operation of choice for symptomatic cholelithiasis (13, 14). The application of laparoscopic technique for cholecystectomy is expanding very rapidly and it is now performed in almost all major hospitals. The laparoscopic approach brings numerous advantages at the expense of higher complication rate especially in training facilities (15). In our study the majority (55%) of the patients were in the age group 21-40 years while (90.5%) were females, this is in agree to study of LC in chronic cholecystitis where the mean age was 38.7years with female to male ratio 5:1(16). In another study, the mean age was 60years and the ratio of female to male was 3:1, where these numbers are quite different from our study (17). We use four ports approach for LC in (190)(95%) cases while three ports approach is used only in (10)(5%) patients, however, recently a two ports needle scope cholecystectomy using all 3mm miniaturized instruments is considered feasible and may further improve the surgical out comes in terms of pain and cosmoses(18). In our study we use Veress needle for creating pneumoperitonium without any complication and good results while blind trocar insertion and access by Veress needle remain the important cause of complications as reported by many authors, gaining access by closed technique has complication rate in the range 0.6-0.9% as reported by Hashizume and Sugimachi(19). On the other hand open technique of trocar insertion has promising results and seems to have reduced the access –related major vessel injury and mortality rate (20). Bile duct injury is a severe and potentially a life threatening complication of LC and several studies report 6.5% to 1.4% incidence bile duct injuries (21). Cystic duct leak is an infrequent but potentially serious complication of LC and can be reduced by locking clips instead of simple clips (22). In our series bile duct injury was minimum and bile leak occurred in only (7) (3.5%) cases. In (5) patients the leak was stopped after 5^{th} day of operation without any intervention and the leak was from slipped clip from the cystic duct or the clip was not clipped well and the cystic duct was not completely closed, while in two cases there were injury to bile ducts and laparotomy was done with T-tube in one case and in the other case, Roux en Y choledocojejunostomy was performed. Vascular

injury was encountered commonly in our series there were (11) (5.5%) cases of trocar site bleeding, they were controlled with pressure alone or using diathermy or needs ligation of the vessel. vascular injury in the Calot, s triangle during dissection occurred in (9) (4.5%) cases and was controlled with clip application while in (3) patients were converted to open surgery. Clinically significant bleeding occurs in 0.5% of patients undergoing LC (14). Liver bed bleeding was controlled with diathermy and tube drain used in almost of all our cases in fear of slipping clips of cystic artery or duct. Shamiyeh et al has 163 patients out of 15596 suffered vascular injury required conversion with a rate 8 %(23). Perforation of gall bladder with stone spillage occurs quite frequently. Aspiration of the distended gall bladder prior to dissection can reduce this (24). In our study gall stones spillage occurred in (32) (16%) patients maximum number were retrieved during procedure and no post-operative complications of abscess or fistula formation in the abdominal wall was reported. It is wiser to stick close to gall bladder wall during dissection avoiding possible injury to the liver sinuses which can cause profuse bleeding. An attempt should be made to remove all the spilled stones as unretrieved stones can cause a variety of complication (25). Wound infection, usually involving the epigatsric cannulation site through which the gall bladder is extracted occurs in 0.3-1% of patients (5). Port site infection was seen in (11)(5.5%) of our patients and all were treated successfully with local wound toilet and oral antibiotics. Significant reduction in post-operative infection is one of the main benefits of minimally invasive surgery as the rate of surgical site infection in 2% versus 8% in open surgery (26). Bowel injuries incidence in LC is 0.07-0.7% and most probably occurs during insertion of the trocar seldom during dissection or adhenolysis and they often remain undetected during operations (23). There was no bowel injury in our study. Conversion from LC to open surgery was done in (8) (4%) of our patients, in 3 patients the gall bladder was adherent closely, and in 3 patients there is vascular injury that bleeding cannot be controlled with routine methods, and in 2 cases they had distorted anatomy. Tayab Met et al, in their study identified two pre-operative risk factors for conversion, signs of inflammation and age more than 60 years (27). Al salamah has reported disturbed anatomy of Calot's triangle as the most common cause of conversion observed in 41.5% of converted cases (28).

References:

1. Cushieri A, Dubois F, Mouiel J, Mouret P, et al "The European experience with laparoscopic cholecystectomy" Am J Surg 1991; 161:385-6.

2. Southren surgeons club. "A prospective analysis of 1518 laparoscopic cholecystectomies" N Eng J Med 1991; 324:1073.

3. Liu CL, Fan ST, Lai EC."Factors effecting conversion of laparoscopic cholecystectomy to open surgery "Arch Surg 1996; 135:98-101.

4. Livingston EH,Rege RV, "A nationwide study of conversion from laparoscopic to open cholecystectomy "Am J Surg 2004;188:205-11.

5. Williams LF Jr, Chapman WC, Bonaan RA,Jacobs JK"A comparison of laparoscopic cholecystectomy with open cholecystectomy in single centre"AmJ Surg 1993;165:459-65.

6. Kane RL, Lurie N, Borbas C, Morris N"The outcomes of elective laparoscopic and open cholecystectomies"J Am Coll Surg 1995; 180:146-45.

7. Brodsky A, Matter I, Sabo E, Cohen A "Laparoscopic cholecystectomy for acute cholecystitis: can the need for conversion and probability of complications be predicted"Surg Endosc 2000; 14:755-60.

8. Alponat A, Kum CK,Koh BC" Predictive factors for conversion of laparoscopic cholecystectomy"World J Surg 1997;21:629-33.

9. Ros A, Carlsson P, Rahmgvist, Bachmank K"Non randomized patients in cholecystectomy trial, characterstics,procedure,and outcome"BMC Surg 2006;6:17.

10. Ji W, Li LT, Li JS "Role of laparoscopic subtotal cholecystectomy in the treatment of complicated cholecystitis" Hepatobiliary pancreat Dis Int 2006; 5(4):584-9.

11. Hobbs MS, Mai Q, et al"Surgeon experience and trends in intra-operative complications in laparoscopic cholecystectomy" BJS 2006; 93:844-53.

12. Hasl DM, Ruiz OR, Gerace C,et al"A prospective study of bile leaks after laparoscopic cholecystectomy"Surg Endosc 2001;15:1299-1300.

13.Jan JT, Suyapto DR, Neo EL, Leong PS"prospective audit of laparoscopic cholecystectomy experience at secondary referral centre in south Australia"ANZJ Surg 2006;76:335-8.(Medline).

14. Vagenas K, Karamankos SN, Panagiotopoulos S"Laparoscopic cholecystectomy, a report from single centre world" J Gastrointestin 2006; 12:3887-90.

15. Cawich SO, Mitchell DL, Newharn NS,"A comparison of open and laparoscopic cholecystectomy done by surgeon in training" WestIndia Med J 2006; 55(2):103-9.

16. Williams LF, Chapman WC, Bonau RA"comparison of laparoscopic cholecystectomy with open cholecystectomy in single center." Am J Surg 1993; 165:459-65.

17. Lau H, Brooks DC "contemporary outcomes of ambulatory laparoscopic cholecystectomy in a major teaching hospital" World J Surg 2002;26:1117-21.

18. Lee KW, Poon CM, Leo DW "Two port needlescope cholecystectomy. Prospective study of 100 cases"Hong Kong Med J 2005;11(1):30-5.

19. Hashizume M, Sugimachi K "Needle and trocar injury during laparoscopic surgery "Surg Endosc 2001;15:275-80.
20. Lal P, Sharma R, Chander R "A technique for open trocar placement in laparoscopic surgery using umbilical cicatrix tube"Surg Endosc 2002; 16:1366-70.
21.Frilling A, Li J, Weber F "Major bile duct injuries after laparoscopic cholecystectomy, a tertiary centre experience"J gastrointest Surg 2004;8(6):679-85.
22. Rohatgi A, Widdison AL, "An audit of cystic duct closure in laparoscopic cholecystectomy"Surg Endosc 2006; 20(6)875-7.
23. Shamiyeh A, Wanyand W, "Laparoscopic cholecystectomy early and late complication and their treatment" Lang enbecks arch Surg2004;389:164-67.
24. Calik A, Topaloglus S"Routine intraoperative aspiration of gall bladder during laparoscopic cholecystectomy"Surg Endosc 2007;(7)85-88.
25. Kumar TS, Saklani AP, Vinanyagam R"Spilled gall stones during laparoscopic cholecystectomy, a review of literature" Postgraduate Med J2004; 80:77-9.
26. Boni L, Benevento A, Rovera F"Complications in laparoscopic cholecystectomy "Surg Inf 2006; 7(2)5109-11.
27. Tayab M, Raza SA, Khan MR "Conversion from laparoscopic cholecystectomy to open cholecystectomy postgrad Med 2005; 51(1)17-20.
28. Al Salamah SM, "Qutcome of laparoscopic in acute cholecystitis" J Coll physicians Surg Pak 2005; 15(7):400-3.