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EARLY COMPLICATIONS FOLLOWOING LAPAROSCOPIC CHOLECYSTECTOMY IN BASRAH GENERAL HOSPITAL

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ABSTRACT:

Background: Gall stone disease is one of the commonly encountered diseases among the general population. Laparoscopic cholecystectomy has been replaced open surgery *and it is now considered the* "golden standard". Numerous complications might be encountered.

Objectives: To assess and evaluate the specific early postoperative complications and its management and to assess the factors that might influence the *development of such complication.*

Patients and methods: *A prospective consecutive observational study was conducted in Basrah General Teaching Hospital from January 2011 to December 2011. All adult patients with symptomatic gall stone were included in this study. The entire demographic, preoperative, operative and postoperative patient's data were collected and evaluated.*

Results: *A 546 patients were underwent laparoscopic cholecystectomy during the study period, 454(83.2%) were female and 92(16.8%) were males. The mean age were 40 years+/- 13.7. Gall bladder perforation with bile leak(with or without gall stone spillage) was the commonest intraoperative complication that occurred in 49(8.97%) patients. Intraoperative bleeding reported in 26(4.76%) patients. Intraoperative bile leak reported in 2(0.36%) patients. The conversion rate was 4.76% (26 patients).The commonest postoperative complication was wound related complication, which was reported in 13 (2.38%) patients. Using logistic regression analysis, we found that the age > 60years, male sex , acute gall bladder status, operation time > 60 min and usage of drain were influenced the development of intraoperative complication on the other hand all the factors failed to affect the development of postoperative complication.*

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Conclusion:

We conclude that the laparoscopic cholecystectomy that performed in our teaching center was performed safely with accepted rate of early postoperative complications in comparison to the other studies worldwide, and these complications were managed successfully in vast majority of patient by simple procedures with accepted conversion rate and no mortality was reported during the period of study.

Introduction:

Gall stone disease is one of the commonly encountered diseases among the general population and its prevalence is variable in different countries ranging from10-15 %[1].Removal of gall bladder is the only treatment for gall bladder stones and till the late of 1980s this was carried out through open abdominal surgery [2]. *From that time,* laparoscopic cholecystectomy (LC) has been replaced open surgery *and it is now considered the "golden standard"* [3].Although it has been anticipated that the intraoperative complication during laparoscopic cholecystectomy will diminish with increasing surgeon experience*, yet it is still reported to be higher than the opened cholecystectomy* [4].Numerous complications might be encountered during LC, some of them are specific to this technique and others are related to laparoscopic surgery in general. The general complications are related to anesthesia, peritoneal access, and to pneumoperitoneum. The specific complications of LC are hemorrhage, gall bladder perforation, bile leakage, spillage of stone, bile duct injury, perihepatic collection, external biliary fistula, wound related complication, foreign body inclusions and adhesions[5].The reported incidence of early complications was ranging from 1.5-2.92% in western countries and 1.5-6.5% in eastern countries.LC was implemented in our teaching center for the last 10 years and we try in this study to evaluate the specific complication related to this procedure.

Aim of the study:

1- To assess and evaluate the specific early postoperative complications after LC and its management.

2- To assess the factors that might influence the *development of such complications.*

Patients and method:

This is a prospective consecutive observational study carried out in Basrah General Teaching Hospital from January 2011 to December 2011.All adult patients with symptomatic gall stone where included in thi

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obtained in addition to preoperative

investigations. Special investigations for patients with other associated medical problems were performed as required. We exclude pediatric age group and the cases which were complicated by common bile duct stone. Special attention was taken for assessment of gall bladder status and its wall thickness by abdominal ultrasound. The patients were informed about the laparoscopic procedure, anesthesia, the possible complications and the possibility of conversion to open surgery. A written consent was taken and signed by every patient.All the patients underwent laparoscopic cholecystectomy under general anesthesia using endotracheal intubation. Four ports, 2 of 10 millimeters and 2 of 5 millimeters were used. LC was performed using a standardized technique by expert surgical teams.We have no influence neither on the decision for conversion to open surgery or on the management of intra and postoperative complications which were left for the operating surgical team. Preoperative cholangiography was not available in our hospital. All the gall bladder specimens send for histopathological examination to confirm the clinical diagnosis.The entire demographic, preoperative, operative and postoperative patient's data were collected in a preformed data sheath and tabulated in SPSS (statistical package for social sciences) version15.We use the mean+/- standard deviation(SD) and the percentages for the descriptive statistics in addition to the logistic regression analysis to assess the possible risk factors that might influence the development of complications. A p value < 0.05 was considered statistically significant.

The results:

Laparoscopic cholecystectomy was performed in 546patients during January 2011 to December 2011 in Basrah Teaching general Hospital. A 454 (83.2%) were females and 92 (16.8%) males, giving female to male ratio of 4.93:1.The mean age of patients were 40 years+/-13.7 ranging from 16-80 years.The mean of body mass index (BMI) was 27.69 +/- 3.39 ranging from 21-38.**Table 1**show the state of gall bladder according to the intraoperative finding which was further confirmed by histopathological examination. It revealed that chronic calculuscholecystitis was encountered in 501(91.8%) patients and acute calculus cholecystitis in 41(7.5%) patients. The mean time of surgery was 45.7 +/- 11.3minutes ranging from30-120 minutes.**Table 2** show the intraoperative complications (IOC) and its management. The overall IOC were occurred in77 (14.1%) patients. The commonest IOC was gall bladder perforation with bile leak which was encountered in 49(8.97%) patients(with or without spillage of gall stor
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drain in 17 (3.11%) and by SI only in 9 (1.65%).The other 23 (4.21%) patients with GSS were managed by stone removal and sub hepatic drain in 12(2.19%). In 11 patients few small stones were left and treated only by IS in 6(1.1%) patients while in 5(0.92%) patients a drain were left after IS. The second IOC was intraoperative hemorrhage which occur in 26 (4.76%) patients. Bleeding was from gall bladder bed in 10(1.83%), from greater omentum in7(1.28%), from cystic artery in 5(0.92%) and from liver injury in 4(0.73%) patients. Electrocoagulation (EC) was satisfactory to stop the bleeding in 20 patients (12 without drain and 8 with drain). The bleeding from cystic artery was controlled by clipping in 3 patients. Conversion to open surgery was the decision to stop bleeding in 3 cases, one from gall bladder bed, one from cystic artery and one from liver injury.Intraoperative bile leak was occurred in 2(0.37%) patients, one from cystic duct and the other from gall bladder bed, both managed by conversion.The conversion rate to open cholecystectomy was 4.76% (26 patients).We found that the most common cause for conversion, as described by the operating surgeon, was the disturbed anatomy at Calot's triangle in 21 (3.84%) out of 26 patients.The drain was used in 79 (14.5%) patients. It is used whenever the surgeon need it or as a part of management of IOC.**Table 3** shows the postoperative complications(POC) and its management. The overall POC occurred in 26(4.76%) patients. Wound related complications represent the commonest complication which were occurred in 13 (2.38%) patients, of which 7 (1.28%) patients presented with infected wound, 3 (0.55%) with seroma, 2 (0.37%) with hematoma and one (0.18%) with discharging sinus. It was treated mainly by drainage or evacuation in 8 patients and by conservative treatment in 4 patients. One patient with discharging sinus needs opened surgery. Bile collection was the second POC which were encountered in 4 (0.73%) patients. Three patients managed successfully by percutaneous drainage under ultrasound guide and 1 by opened surgery. Retained common bile duct (CBD) stone occurred in 3 (0.55%) patients. Two of them managed by endoscopic sphincterotomy and one patient by opened surgery. Non obstructive jaundice was encountered in 3 (0.55%) patients and treated conservatively after exclusion of other causes like hepatitis, bile duct injury, hemorrhage or hematoma. Sub-hepatic abscess developed in 2 (0.37%) patients and were treated by opened surgery. One (0.18%) patient developed postoperative haemorrhage which managed by emergency opened surgery. No mortality was encountered during the period of our study.**Table 4** shows the logistic regression analysis of the factors that might affect the development of intraoperative and postoperative complications. Among all the variables that we evaluate to be a possible risk factor, we found that being a male and being with age more than 60 years were associated with increased risk of IOC (P value 0.037, 0.01

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were associated with increased risk of development of IOC (P value 0.001,

0.001). The use of the drain has a statistically significant association with the development of IOC (P value 0.001). The BMI and the presence of medical illness failed to show a statistically significant effect on the development of IOC (P value 0.105, 0.060). On the other hand all the variables fail to have a statistically significant effect on the development of POC (P value > 0.05).

Table 1:***Shows the status of gall bladder(intraoperative diagnosis).***

Diagnosis	*No. (%)*
Chronic calculus cholecystitis	*501 (91.75%)*
Acute calculus cholecystitis	*41 (7.50%)*
Acalculuscholecystitis	*2 (0.39%)*
Gall bladder mucocele	*1 (0.18%)*
Empyema of gall bladder	*1 (0.18%)*
Total	*546 (100%)*

Table 2: Intraoperative complications and its management

Complication		Number (%)	Management
Gall bladder perforation with bile leak	Without GSS	26(4.76%)	17 IS + drain 9 IS
	With GSS	23(4.21%)	12 IS. Stone removal + drain. 6 IS * 5 IS + drain*
	Total	49(8.97%)	
Intraoperative hemorrhage	From liver bed	10 (1.83%)	8 EC +drain 1Conversion 1 EC
	From greater omentum	7 (1.28%)	5 EC 2 EC + drain
	From cystic artery	5 (0.92%)	3 Clipping. 1 Conversion 1 EC + drain
	From liver Injury	4 (0.73%)	2 EC 1 EC + drain 1 Conversion
	Total	26 (4.76%)	
Intra operative bile leak	Slipped cystic duct clips	2 (0.37%)	2 Conversion
	From hepatic bed		
Total		77 (14.1%)	

***GSS**: gall stone spillage. **IS**: irrigation- suction. **EC**: electrocoagulation. *: stones not completely removed.*

Table 3:Thepostoperative complication and its management.

POC		Number (%)	Management			
			Conserva -tive treatme nt	Minimal access	Open surgery	Drainage or evacuatio n
Wound related complic-ation	Infection Hematoma Seroma sinus	7 (1.28%) 2 (0.37%) 3 (0.55%) 1 (0.18%)	4		 1	3 2 3
	total	13(2.38%)	4		1	8
Bile collection		4 (0.73%)		3 by percutaneous drainage under USS guide	1	
Retained CBD stone		3 (0.55%)		2 by ES	1	
Non obstructive jaundice		3 (0.55%)	3			
Sub hepatic abscess		2 (0.37%)			2	
Postoperative hemorrhage		1 (0.18%)			1	
Total		26(4.76%)	7	5	6	8

***POC**: postoperative complication. **USS**: ultrasound scan. **ES**: endoscopic sphinctrotomy*.

Table 4: Shows the logistic regression analysis of the factors that might affect the development of intraoperative and postoperative complications.

FACTOR	IOC	POC
SEX(male)	+ve p= 0.037	-ve p = 0.580
Age(> 60)	+ve p= 0.013	-ve p = 0.229
BMI	-ve p= 0.105	-ve p = 0.558
MI(present)	-ve p= 0.060	-ve p = 0.901
Acute state	+ve p= 0.001	-ve p = 0.360
0peration time(>60 min)	+ve p= 0.001	-ve p = 0.289
Use of drain	+ve p =0.001	-ve p = 0.739

IOC= intraoperative complication. **POC**= postoperative complication. **BMI=**Body mass index. **MI=**medical illness. **P=** p value.

Discussion:

Over the last two decades, LC has gained worldwide acceptance to be the 'gold standard' in the surgical management of symptomatic cholecystolithiasis[6]. It is the commonest operation performed laparoscopically[7]. This study was specially aimed to focus on the specific intraoperative and postoperative complications of LC *and its management*.In our study the mean age of patients were 40 years +/-13.7 ranging from 16-80 years*. The females were predominant 454 (83.2%), giving female to male ratio of 4.93:1.We use the 4 ports standerdised technique for all patients and the first trocar access performed through opened technique. In this study we do not report any injury to great vessels (aorta, inferior vena cava, inferior epigastrics, iliac or mesenteric) or visceral injury and all trocar site bleeding was simple and stopped at the end of the procedure. This finding could be explained by the use of opened method for first trocar access which permits direct vision that contributed to considerable limitation of the vascular or visceral injuries[8]. In a large collective study, the reported incidence of major vessels injury was zero using open method* versus 0.075% in closed method, on the other hand the incidence of visceral injury was 0.048% in opened versus 0.83% closed method [8,9]*.Out of 546 patients in this study, 77(14.1%) patients were developed various specific intraoperative complications. Gall bladder perforation with bile leak with or without gall stone spillage was the most common complication in 49 (8.97%) patients (26 (4.76%) withoutGSS,23 (4.21%) associated with GSS).* Perforation of the gall bladder occurs fairly frequently during laparoscopic cholecystectomy and the reported incidence in the range of 10%–40% in various series [10, 11]. GSS is less frequent and the true incidence of unretrieved stones is difficult to determine ranging from 6%–30%[12], other reported incidence of approximately 2 %[13]. In our study the incidence of gall bladder perforation and GSS were within the reported range.Perforation of gall bladder can occur during dissection of the gall bladder off the liver bed, tearing with grasping forceps, or during extraction of the gall bladder through one of the port sites[12]. Stones spilled may remain in the peritoneal cavity adjacent to the liver or may migrate to various distant sites, these stones can cause a complication and in the majority of cases, these stones usually cause no bother and remain benign. Complications that result from these stones may occur in 0.08%–0.3% of patients [10, 14]. In our study there was no reported complication in all patients with GSS even those with some unretrieved stones. Tearing by the grasping forceps was the common cause in our study followed by spillage during gall bladder extraction.In our study there was 26 (4.76%) cases developed intraoperative hemorrhage. In 20 patients the bleeding were simple and was controlled by EC. Intra acco complications seen in LC[15,16]. The reported incidence of uncontrollable

bleeding in LC is 0.03 -10 %[15, 17-19], with the conversion rate of 0.26% [19]. In our study 3(0.54%) patients developed bleeding that necessitates conversion to control. In 3(0.54%) patients with bleeding from cystic artery were controlled successfully by clipping of cystic artery. We do not report significant port site as most bleeding stopped after completion of LC. The reported incidence of bleeding from the port site is 9.97%, that mainly treated by pressure but some need exploration and ligation of the vessel [15].Many factors such as assistant(camera man) experience, operator experience or mechanical malfunction of instruments may lead to such a problem [20].The incidence of major vascular injuries in laparoscopy (including aorta, iliac vessels, vena cava, inferior mesenteric arteries and lumbar arteries) is 0.07%–0.4% and for minor injuries (branches of the epigastric vessels, mesenteric and omentum vessels) is 0.1% – 1.2% [21,22]. We do not report major vascular injury in our study.Two (0.37%) patients developed intra operative bile leak, one from liver bed after removal of gall bladder, the other was from slipped clips from short cystic duct, both treated by conversion. The cystic duct was short that preclude safe clipping. The bile leak from the liver bed was discovered to be from sizable accessory duct.Bile duct injury is a severe and potentially life threatening complication of LC and several studies reports an incidence of 0 % to 1.4% [23,24] . We do not report intraoperative bile duct injury (CBD or hepatic duct) in our study. This could be explained by a lower threshold for conversion in our hospital when any doubt concerning the safe dissection of Calot's triangle exists. This rate could be reduced more if the intraoperative cholangiography performed, which not available in our hospital. The reported conversion rate ranged from 1.5% to 7.7% [25] . We had 26 (4.76%) patients with conversion, mainly due to disturbed anatomy at Calot's triangle (dense adhesions) in 13 patient, acutely inflamed gall bladder in 5 patients, contracted small fibrotic adherent gall bladder in 3 patients, intraoperative bleeding in 3 patients and intraoperative bile leak in 2 patients.The overall POC in our study were occurred in 26 (4.76%) patients. The most common POC encountered was wound related complications that happened in 13 (2.38%) patients. All patients respond well to simple wound care measures apart from one patient with discharging sinus which require surgery.Wound infection usually involves the cannulation port and the epigastric port through which the gallbladder is extracted, with a reported incidence of 0.3% to 4.84% [26,27]. In our study the wound infection rate was 1.28%(7patients), this rate could be improved more by using gall bladder retrieval bag, as most common site of infection in our study was the epigastric port which we usually use to extract the gall bladder.We reported 4(0.73%) patients who developed postoperative bile collection. Three of them were managed by percutaneous drainage under USS guide and one patient by open surgery. Successful management by percutaneous drainage of 3patients out of the 4 suggest major b no appa during exploratory laparotomy and the

patient recovered smoothly. The incidence of bile leak after laparoscopic cholecystectomy ranges between 0.2% and 2%, and may cause intra-abdominal collections, fistula formation or life threatening bile peritonitis [8]. The presence **of** bile collection and associated biliary injury **of**ten went unsuspected for a time until symptoms worsened and delays in diagnosis and treatment allowed bile peritonitis and serious illness to develop [28].It usually comes from the cystic duct stump due to misplacement of the clips, from common bile duct injury or from a missed accessory duct or small bile ducts of the gallbladder bed, i.e. Luschka's duct[8] .In our study there were 3 (0.54%) patients presented with retained CBD stones who presented during the 30 days of follow up. It was treated by ERCP with sphincterotomy and stone extraction in 2 cases and 1case treated by open surgery. The reported incidence of retained CBD stones is 0.14%[29]. We reported a higher incidence which could be explained by the lack of preoperative cholangiography or poor preoperative assessment for some patients.Although magnetic resonance cholangiography (MRC) is valuable for preoperative evaluation of common bile duct (CBD) stones before laparoscopic cholecystectomy , this examination is not routinely performed in many institutions because of cost–benefit concerns. Therefore, unexpected CBD stones may cause biliary obstruction after laparoscopic cholecystectomy [5,30]. Rarely, small gallbladder stones maymigrate into the CBD in patients with a patulous cystic duct when the gallbladder is pulled in a cephalic dire ction during its dissection [31].We had 3 (0.55%) cases of non-obstructive jaundice which is resolved spontaneously and uneventfully. If a patient has fever or jaundice after LC which is prolonging for more than three days, bile duct injury should be suspected and should be assessed by ultrasonography or computed tomography (CT) [32] .These investigations may show perihepatic fluid collection, although the absence ofthese findings does not exclude injury [33]. In our study, we exclude these possibilities by doing MRCP in addition to the above investigation. We reported 2 (0.37%) patients who presented with sub- hepatic abscess. Both were managed successfully by open surgery. The reported incidence of this complication ranged between0.1% and2.9% [22,31] . The incidence in our study was within the reported incidence.We had 1 (0.18%) patient presented with postoperative bleeding which discovered to be from the greater omentum and he saved by emergency exploratory laparotomy.No 30- day's mortality was reported during the study period. The reported mortality was <1 %[22].We try to assess statistically the effect of possible risk factors on the development of the specific IOC and POC using the logistic regression analysis test. We found that being a male with age more than 60 years presenting with acute cholecystitis will increase the risk of development of IOC. The operation time and the use of drain could be consequences of these complications or as a part of its management. Althou report increased risk of development of IOC [33], they fail to do so in our study,

possibly because the numbers of morbidly obese patients in our study were less in comparison to these studies. By assessing the effect of these factors on the development of POC, none of them have statistically significant association, this could be explained by the concentration of our study on early POC during 30 days postoperatively and some of these complications might developed after the study period of observation.

Conclusion:

We conclude that the LC that performed in our teaching center was performed safely with accepted rate of early postoperative complications in comparison to the other studies worldwide, and these complications were managed successfully in vast majority of patient by simple procedure with accepted conversion rate and no mortality was reported during the period of study.

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المضاعفات المبكرة ما بعد عملية استئصال المرارة بالناظور في مستشفى البصرة العام.

الخلاصة

الخلفية: *حصاة المرارة من الأمراض الشائعة في المجتمع واستئصال المرارة بواسطة الجراحة المنظارية أصبح البديل المثالي للعملية فتح البطن على الرغم من إحاطتها ببعض المضاعفات. تهدف الدراسة إلى تقييم المضاعفات المبكرة والتي تخص عملية استئصال المرارة بالناظور وطرق معالجتها والعوامل التي قد تساعد على حدوثها.*

المرضى والطريقة: *أجريت دراسة مستقبليه متعاقبة و رصدية في مستشفى البصرة العام التعليمي العام ابتدأت من كانون الثاني 2011 إلى كانون الأول 2011. وشملت الدراسة المرضى البالغين المصابين بحصاة المرارة. تم رصد عوامل مختلفة كديموغرافية المصابين مثل العمر،الجنس ومعلومات ما قبل العملية والمضاعفات أثناء وما بعد العملية وتحليلها وتقييمها.*

النتائج: *شملت الدراسة 546 مصاب أجريت لهم عملية استئصال المرارة بالناظور، 454منهم (83.2%) نساء و 92(16.8%) رجال، متوسط عمر المرضى 40 سنه +/- 13.7. أكثر المضاعفات الحاصلة أثناء العملية كانت انثقاب المرارة مع نضح الصفراء (مع أو بدون سقوط حصاة المرارة) حدثت عند 49(8.97%) مريض ثم يليها النزف أثناء العملية عند 26(4.76%) مريض. النضح المراري داخل العملية حدث في مريضين (0.36%) . التحويل من الجراحة بالناظور إلى فتح البطن حدثت في 26 (4.76%) مريض. لم تحدث حالات وفيات أثناء الدراسة . أكثر المضاعفات التي حدثت خلال 30يوم بعد العملية تتعلق بجرح العملية وحدثت عند 13 (2.2%) مريض. باستخدام نظام التحليل الإحصائي المنطقي وجدنا إن العوامل التالية العمر أكثر من 60 سنه، الجنس الذكر، حالة المرارة الحادة, استغراق العملية لأكثر من 60 دقيقه واستخدم أنبوب البزل جميعها تؤثر وبدلالة إحصائية على إمكانية ظهور المضاعفات أثناء العملية ولكنها لا تؤثر على نسبة المضاعفات ما بعد العملية.*

الاستنتاج:

استئصال المرارة بواسطة التنظير في مستشفانا هي طريقه أمينه وفعاله مع نسبة مقبولة من المضاعفات المبكرة مقارنتا بالدراسات العالمية وهذه المضاعفات تعالج بنجاح بتداخلات بسيطة لمعظم الحالات وبنسبة مقبولة للتحول من الجراحة المنظارية إلى فتح البطن.