ORIGINAL ARTICLE

A RETROSPECTIVE ANALYSIS OF COMPLICATIONS IN 2348 CASES OF LAPAROSCOPIC CHOLECYSTECTOMIES

Satish Kumar Bansal[1], Umesh Kumar Chhabra[2], Sandeep Kumar Goyal[3], Pawan Kumar Goyal[4], Sachin Bhayana[5], Chandrashekhar Sharma[6]

[1]Associate Professor, [2, 3]Assistant Professor, [4]Professor, [5,6]Senior Resident, Department of General Surgery, MAMC, Agroha, Hisar, Haryana

ABSTRACT:

Background: Laparoscopic cholecystectomy (LC) has become the "gold standard" surgical procedure for treating gallstones although some complications appear more frequently than with the open technique. Several aspects of these complications and their treatment possibilities are analyzed. **Materials and methods:** Over the duration of last eight years 2348 LCs have been performed at MAMC Agroha, out of these 258 (11%) were men and 2090 (89%) women. Ages ranged between 24 and 89 years, and 6.4% patients were aged above 65 years. Acute cholecystitis was present in 8.5% of the patients and 42.8% patients were obese. **Results:** The most common operative complications encountered were haemorrhage (99 cases, 4.2%), iatrogenic perforation of the gallbladder (458 cases, 19.5%) and common bile duct (CBD) injuries (6 cases, 0.3%). Conversion to open operation was necessary in 66 patients (2.8%), usually due to obscure anatomy because of acute inflammation. The main postoperative complications were bile leakage (33 cases), haemorrhage (6 cases), sub-hepatic abscess (4 cases) and retained bile duct stones (9 cases). Among patients with postoperative complications 36.5% responded to conservative treatment and 23.1% required open surgery. In 40.4% of cases minimally invasive procedures were used successfully: 6 laparoscopic re-operations (for choleperitoneum, haemoperitoneum and subhepatic abscess) and 15 endoscopic sphincterotomies (for bile leakage from the subhepatic drain and for retained CBD stones soon after operation). Three deaths were recorded (0.1%). **Conclusion:** Most of the postoperative complications except for the bile duct injuries were resolved by conservative or minimally invasive treatment. The good results obtained allow us to recommend these minimally invasive procedures in appropriate patients to decrease the morbidity due to copmlications of laparoscopic cholecystectomy.

Keywords: laparoscopic cholecystectomy, open cholecystectomy, complications, minimally invasive treatment of complications

Corresponding author: Dr. Satish Kumar Bansal, Associate Professor, Department of General Surgery, Maharaja Agrasen Medical College, Agroha, Haryana, India capric2@yahoo.com

How to cite this article: Bansal SK, Chhabra UK, Goyal SK, Goyal PK, Bhayana S, Sharma C. A Retrospective Analysis Of Complications In 2348 Cases Of Laparoscopic Cholecystectomies. J Adv Med Dent Scie Res 2015;3(6):S36-S42.

INTRODUCTION

Laparoscopic cholecystectomy (LC) has become the "gold standard" surgical procedure for the treatment of symptomatic cholelithiasis during the past decade[1]. Although being a procedure of choice for cholelithiasis, laparoscopic cholecystectomy is not completely risk free and some complications are more frequent than with open cholecystectomy (OC)[2]. In the comparative study by Jatzko *et al.*[3], open operation was associated with a 7.7% morbidity rate, compared with 1.9% for LC, and a 5% mortality rate vs 1% for LC. Contrary to initial reports of an increased complication rate, recent data show that LC entails lower morbidity and mortality rates than open operation.[4,5,6,7] One of the most frequent situations carrying an increased operative risk is acute cholecystitis[1,2]. The major problems related to LC are bile duct injury, haemorrhage and subhepatic abscess[1,2]. A study by comparing laparoscopic with open cholecystectomy, showed that bile leak and haemorrhage from the gallbladder bed were 2.7 times less frequent in OC[2]. The risks and complications of LC must be neither over-rated nor under-rated. This study analyzed the frequency of these complications and the best possible treatments for them.

MATERIALS AND METHODS

During the duration of 8years from June 2007 to January 2015, 2863 cholecystectomies were

performed general surgery department of MAMC, Agroha. Out of these 515 (18%) were open procedures. Gallstones were present in the common bile duct in 19 of these cases.

Laparoscopic cholecystectomy (LC) was performed in 2348 (68%) of these patients, 258 (11%) being men and 2090 (89%) women. Ages ranged between 24 and 99 years, and 150 patients were aged over 65 years. Our series included one pregnant woman in the second trimester of pregnancy and 1005 obese patients.

For laparoscopic cholecystectomies we have followed the procedure recommended by Zucker[8] regarding both placement of the operative team and the sites of trocar insertion. For intra-operative exploration of the main bile duct selective laparoscopic cholangiography was performed when dilatation of the cystic duct (>3 mm diameter) was associated with small calculi in the gallbladder. We also performed choledochoscopy by the transcystic route in 25 cases and by choledochotomy in 4 cases, with extraction of calculi from the main bile duct in 19 cases. When the stone migration was suspected and the main bile duct could not be explored, patient was referred for ERCP to be performed 3–5 days postoperatively.

RESULTS

Technical difficulty: Acute cholecystitis with adhesions, chronic cholecystitis with shrunken fibrotic gallbladder and the presence of cirrhosis created particular difficulty, sometimes requiring conversion to open operation. Great difficulty (grades III and IV) was correlated with the male sex, age >65 years and the presence of an inflammatory syndrome. The patients with grade III and IV difficulty accounted for 81.9% of those with high fever in association with biliary colic and for 86.4% of the patients in whom US revealed a thickened gallbladder wall. This thickness was caused either by inflammation of the gallbladder wall or by the adherence of the greater omentum to the gallbladder. The grade of difficulty of the operation was assessed by Cuschieri's scale.[9]

Table 1: Intra-operative diagnosis

Diagnosis	Number of cases (%)
Acalculous cholecystitis	143 (6.1)
Chronic calculous cholecystitis	1864 (79.4)
Gall bladder mucocele	49 (2.1)
Acute cholecystitiss	200 (8.5)
Sclero-atrophic cholecystitis	73 (3.1)
Gallbladder+CBD lithiasis	19 (0.8)
Total	2348 (100)

Table 2: Degrees of obesity

Degree	Number (%)
1st degree (20–24% over ideal weight)	300 (29.9)
2nd degree (25–30% over ideal weight)	345 (34.3)
3rd degree (31–99% over ideal weight)	354 (35.2)
4th degree (morbid obesity)	6 (0.6)
Total	1005

Table 3: Grading of difficulty during operation

Grade	Number of cases (%)
Grade 1	1413 (60.2)
Grade II	606 (25.8)
Grade III	263 (11.2)
Grade IV	66(2.8)

Table 4: Intra-operative hemorrhage: 99 cases (4.2%)

1. From cystic artery	**38**	**Tangential lesions** **Total section** **Conversions**	**30** **8** **3**
2. From gallbladder bed	54	Treatment with cautery and haemostatic patch Conversions	50 4
3. From hepatic artery	2	Conversions	2
4. From greater omentum	5	Laparoscopic haemostasis	5

Table 5: Bile duct injuries (14 cases, 0.6%)

Right hepatic duct lesions	
Roux-en-Y hepaticojejunostomy	3
T-tube drainage	2
CBD lesions	
Total section (Roux-en-Y hepaticojejunostomy)	3
Partial lesions (T-tube drainage)	6

Table 6: Conversion to open operation (66 cases, 2.8%)

Obligatory conversions	**Total section of the CBD**	**1**
	Partial lesions of the CBD	3
	Lesion of the right hepatic duct	2
	Haemorrhage from the gallbladder bed	4
	Haemorrhage from the cystic artery	3
	Haemorrhage from right hepatic artery	2
Elective conversions	Pericholecystitis	26
	Internal biliary fistula	4
	Adhesions after previous laparotomy	9
	CBD stones	6
	Perforated gallbladder	4
	Gallbladder neoplasm	2

Table 7: Early complications and their treatment

Complication	**Conservative treatment**	**Minimally invasive treatment**	**Open surgery**	**Total**
Bile leak	16	6 EST	3	25
Choleperitoneum	–	2 laparoscopic	6	8
Postoperative haemorrhage	3	2 laparoscopic	1	6
Subhepatic abscess	–	2 laparoscopic	2	4
Retained bile duct stone	–	9 EST	–	9
Total	19 (36.5%)	21 (40.4%)	12 (23.1%)	52
EST, endoscopic sphincterotomy				

Intra Operative complications

Most common intra-operative complications encountered were haemorrhage, injury of the bile ducts and conversion to open operation.

Haemorrhage was caused by tangential side lesions of the cystic artery (30 cases) and rarely by its total sectioning (8 cases). Out of these in 35 cases laparoscopic haemostasis was achieved by clipping the artery and three cases required conversion to an open operation. Bleeding from the gallbladder bed (54 cases) was noted especially in those patients with acute cholecystitis or cirrhosis. Out of these in 50 patients haemostasis was achieved by using cautery and haemostatic patch, while in 4 cases conversion was needed for

achieving haemostasis by suturing the peritoneum of the gallbladder and for inserting a subhepatic drain. Two cases of right hepatic artery injury required conversion whereas in all the five cases of omental bleeding was controlled laparoscopically.

Injury of the bile ducts occurred in 14 (0.6%) patients, out of which 6 of the injuries being identified intra-operatively during the dissection. According to Way's classification[10], eight were grade I (tangential), five grade IIIA (total sectioning without loss of substance) and one grade IV (total sectioning of CBD with loss of substance). In eight patients insertion of a T-tube drain was sufficient, and in the other 6 patient's bile flow was reestablished by Roux-en-Y hepaticojejunostomy.

Six of the fourteen bile duct injuries including two of the right hepatic duct and four of the CBD injuries were discovered intra-operatively during the dissection. In 6 of the 14 cases of injury, the anatomy was obscured due to acute cholecystitis, and the others occurred in patients with a shrunken fibrosed gallbladder.

Perforation of the gallbladder during dissection or extraction was recorded in 458 (15.9%) patients. This is more troublesome rather than serious complication, as the grasping and extraction of lost gallstones in the peritoneal cavity prolongs the operation time.

Conversion to open operation was necessary in 66 (2.8%) cases. Acute cholecystitis with pericholecystitis was recorded in 26 patients and was the predominant reason for conversion. Peritoneal adhesions in the scarred abdomen were a conversion cause in only 9 of 89 patients. To avoid adhesions, a right upper quadrant approach was used in 45 patients and Hasson's trocar in 35 patients with a history of previous laparotomy.

Early postoperative complications

Early postoperative complications directly related to the surgical technique were graded according to Clavien's classification[11].

Grade I complications, which affect the ideal postoperative course but do not require treatment, include suppuration at the umbilical trocar site, which occurred on fifth to seventh post operative days. There were 47 (2%) such cases of limited extent, cured by local treatment within a few days; 42 of these occurred in patients operated for acute cholecystitis, and obesity was present in 28 of them.

Grade IIA complications require conservative treatment and prolong hospitalisation but leave no sequelae. There were 16 patients with a bile leak and 3 with haemorrhage via the subhepatic drain. Drainage was quantitatively moderate in amount (approx. 50–60 ml blood and 250–300 ml bile per day), persisted for 6–10 days and stopped spontaneously. Eleven of these patients were operated for acute cholecystitis and 9 were obese.

Grade IIB complications require laparotomy or laparoscopic re-intervention or endoscopic maneuvers, but heal without sequelae. In three patients with a massive bile leak (600–800 ml/day) in the subhepatic drain, revisional operation was performed. In 6 patients with bile leak, endoscopic sphincterotomy (EST) was performed, sometimes associated with a transpapillary stent, followed by a diminished biliary drainage, which finally stopped. T-tube drainage was required in two patients with tangential lesions of the right hepatic duct and a Roux-en-Y hepaticojejunostomy in one patient with total section of the CBD. These three injuries were missed at the original operation.

Choleperitoneum occurred in patients operated for acute cholecystitis without insertion of a subhepatic drain. Six such patients required formal laparotomy, with suture of the gallbladder peritoneum and drainage. In another two patients a laparoscopic re-intervention was performed and in one case there were aberrant bile ducts in the gallbladder bed, which was clipped. Among all these patients with choleperitoneum, there were 6 with acute cholecystitis.

Prolonged bleeding from the gallbladder bed necessitated suture of the gallbladder peritoneum in one patient. In two patients haemostasis was achieved by laparoscopic re-intervention by application of haemostatic patch in the gallbladder bed.

Subhepatic abscess occurred in 4 patients with a difficult cholecystectomy because of acute cholecystitis. In two of those cases laparotomy was done and in another two had laparoscopic drainage.

Grade III complications were not recorded, i.e. complications (other than bile duct stricture) developing after surgical or laparoscopic re-operation.

Grade IV represents death and there were 3 such cases (0.1%). Two patients with bile leakage required reoperation and developed irreversible septic shock. The third patient died suddenly from myocardial infarction.

Late postoperative complications

At late postoperative follow-up after 3 months and 1 year duration, we found residual calculi in 9 patients. These patients had no intra-operative exploration of the bile duct and had no preoperative clinical or laboratory evidence of

CBD stones. Their calculi were extracted using endoscopic sphincterotomy.

Umbilical site incisional hernia occurred in 6 patients who required either an extended incision for extraction of large calculi or who developed local infection at the umbilicus. All hernias were repaired.

DISCUSSION

Laparoscopic cholecystectomy (LC) has become the "gold standard" surgical procedure for the treatment of symptomatic cholelithiasis during the past decade[1]. Laparoscopy is not easy for the surgeon, thorough instruction as well as experience being crucial for improvement of results. The risks and complications of LC must be neither over-rated nor under-rated. Contrary to initial reports of an increased complication rate, recent data show that LC entails lower morbidity and mortality rates than open operation.[4,5,6,7] In the comparative study by Jatzko *et al.*[3], open operation was associated with a 7.7% morbidity rate, compared with 1.9% for LC, and a 5% mortality rate vs 1% for LC.

One of the most frequent situations carrying an increased operative risk is acute cholecystitis[1,2]. First, pericholecystitis modifies the local anatomy and increases the difficulty of identifying the cystic pedicle and CBD. Because it is impossible to perform antegrade cholecystectomy in most such cases, there is a high risk of CBD injury. Second, the cleavage plane in the gallbladder bed is lost, and that makes it easy to penetrate the liver parenchyma during dissection of the gallbladder, thus creating the possibility of postoperative bile leak, haemorrhage and subhepatic abscess. Other situations associated with increased difficulty in cholecystectomy are a shrunken fibrotic gallbladder, cirrhosis with extension of regenerating nodule into the gallbladder bed and in a few cases of obesity leading to the marked fatty infiltration of the cystic pedicle. However, the postoperative morbidity and mortality rates, as well as the excellent late results, allow us to conclude that obese patients are the principal beneficiaries of the laparoscopic technique. It avoids the wound infection, wound dehiscence and especially the incisional hernia that often complicate open cholecystectomy in the obese.

The major problems related to LC are bile duct injury, haemorrhage and subhepatic abscess[1,2]. Lesions of the extrahepatic bile ducts can occur at any level as follows. Detachment of the gallbladder may open any accessory bile ducts present in the gallbladder bed [12,13,14,15], post-mortem studies demonstrate their presence in 3–5% of individuals [13]. However, accessory bile ducts were only recognized in three patients immediately after detachment of the gallbladder. Postoperative bile leak and choleperitoneum were avoided by clipping these ducts. When bile leakage >500 ml/24 h persists in the early postoperative period, endoscopic sphincterotomy or transpapillary stenting are recommended [16,17,18,19]. Bile duct decompression usually leads to cessation of the bile leak, thus avoiding re-operation. Choleperitoneum may develop in patients without a subhepatic drain. In well equipped hospitals, subhepatic collections can be managed by percutaneous drainage using ultrasound guidance, and this will usually suffice for a leak from the gallbladder bed. We have evacuated and drained two bile collections by laparoscopic re-interventions. In one case accessory bile ducts were noted in the gallbladder bed and were clipped. In most of these cases detachment at the first operation had been difficult because the obliterated planes leading to the breach of liver capsule.

After open cholecystectomy postoperative bile leak or choleperitoneum from cystic duct is rare, but these complications are more frequent in LC. Woods *et al.* [14] noted this cause in 17 of 34 cases with biliary complications. In our series we noted it in only one patient with slippage of the clips from a short cystic stump.

The most serious problem is an injury to the main bile duct. Although the differences are not statistically significant, this injury is more frequently seen in LC (1% of cases) [3,9,10,14,20,21] than in open cholecystectomy (0.5% of cases)[4]. Analyzing 15 cases (0.8%) of CBD injury among 6067 cases operated by laparoscopy in Holland, Schol *et al.* [10] found two common causes. The first cause was acute cholecystitis, which caused difficulty in identifying the anatomy in two-thirds of cases. The duct was injured usually following confusion between the CBD and the cystic duct. Likewise in our series, these lesions occurred in cases with obscured anatomy. Because fundus-first cholecystectomy cannot always be performed, the decision for conversion is justified in any patient in whom the anatomy is unclear. The second cause is the surgeon's lack of experience, a fact proved by the learning curve. Huang *et al.*[7] analyzed 6 lesions of the CBD produced in a series of 350 LCs and reported that they occurred among the first 10–15 laparoscopic operations performed by the surgeon.

A particular mode of CBD injury that is specific to LC is clipping the ‘cone’ of CBD with the first clip applied to the cystic duct. To avoid this situation it

is preferable to apply the clip at a little distance from the cysticocholedochal junction, because endoscopic studies show that a long cystic stump without stones is not a true cause of post-cholecystectomy pain[22].

Congenital biliary anomalies must not be ignored. Two variants are usually encountered. Four of our patients had an accessory right hepatic duct, which ran into the cystic duct above its junction with the common hepatic duct. The ideal solution is to cut the cystic duct above its confluence with the accessory duct. Another anomaly identifiable only by laparoscopic cholangiography or a good ERCP is entry of the cystic duct into the right hepatic duct. We have encountered this anomaly in three patients, two of whom suffered a complete section of the right hepatic duct.

Haemorrhage due to arterial injury is usually a reason for conversion.[5,6] Generally, the uncontrolled reaction of the surgeon is more dangerous than the haemorrhage itself: blind clip application or, even more serious, the blind use of the electrocautery hook can cause severe injury to the bile duct. Rapid grasping of the injured vessel will usually allow good temporary laparoscopic haemostasis and then, by clipping, definitive control. In this series three patient in whom the cystic artery was too short or sectioned near its origin needed laparotomy for haemostasis.

Haemorrhage from the gallbladder bed was encountered more frequently in acute cholecystitis, in patients with a shrunken fibrotic gallbladder and in cirrhotics. Haemostasis was achieved by using a haemostatic patch or even by conversion in order to suture the peritoneum of the gallbladder in four cases.

Bile leakage and bleeding may determine subhepatic abscess formation. Huang *et al.*[7] reported 3 such complications in a group of 350 LCs. The clinical picture was manifest 7–10 days after operations performed for acute cholecystitis. Pain in the right upper quadrant, fever, leucocytosis and ultrasonography led to the diagnosis. Evacuation and drainage of the abscess were performed by open operation in two cases and by laparoscopic means in another two cases. An excellent opportunity for minimally invasive treatment is offered by USG guided percutaneous drainage, if the means are available to perform it in safe conditions. A study by Duca etal[23], comparing laparoscopic with open cholecystectomy, showed that bile leak and haemorrhage from the gallbladder bed were 2.7 times less frequent in OC. There was no case of subhepatic abscess. In open cholecystectomy they practised routine suturing of the gallbladder peritoneum[24]. The same maneuver resolved the complications after laparoscopic cholecystectomy in 6 patients in whom re-intervention was needed. It is therefore believed that inability to suture the gallbladder peritoneum represents the 'Achille's heel' of laparoscopic cholecystectomy.[23]

Retained bile bile duct stones were detected at an early stage (1–4 days) in nine patients. Bile duct stones were suspected at the time of LC because of numerous microcalculi in the gallbladder or a large cystic duct and dilated CBD. Because full investigation of the CBD was impossible at operation, ERCP with sphincterotomy and calculus extraction was performed 5–6 days after LC.

Of the 52 patients with postoperative complications, open operation was used in 12 (23.1%) cases and laparoscopic re-operations or endoscopic maneuvers in the remaining 40 (76.9%).

CONCLUSION

This study demonstrate that laparoscopic cholecystectomy is an operation associated with low morbidity and mortality rate, but bile duct injury is still a major problem. Complications of laparoscopic cholecystectomy can be minimized by improving operative procedure and most of the postoperative complications except for the bile duct injuries were resolved by conservative or minimally invasive treatment. Minimally invasive treatment was very efficient and offered optimum healing conditions if correctly indicated, thereby transforming an operative failure into a postoperative success. These good results obtained allow us to recommend these minimally invasive procedures in appropriate patients to decrease the morbidity due to copmlications of laparoscopic cholecystectomy.

REFERENCES

1. Sicklick JK, Camp MS, Lillemoe KD, Melton GB, Yeo CJ, Campbell KA, et al. Surgical management of bile duct injuries sustained during laparoscopic cholecystectomy: perioperative results in 200 patients. Ann Surg. 2005;241:786–792.
2. Hardy KJ, Miller H, Fletcher DR, Jones RM, Shulkes A, McNeil JJ. An evaluation of laparoscopic versus open cholecystectomy. Med J Aust. 1994 Jan 17;160(2):58–62.
3. Jatzko G, Lisborg PH, Perti AM, et al. Multivariate comparison of complications after laparoscopic cholecystomy and open cholecystectomy. Arm Surg. 1995;221:381–6.
4. Deziel DJ, Milikan KW, Economou SG, et al. Complications of laparoscopic cholecystectomy: a

national survey of 4292 hospitals and an analysis of 77604 cases. Am J Surg. 1993;165:9–14.
5. Bailey RW, Zucker KA, Flowers JL, et al. Laparoscopic cholecystectomy. Arm Surg. 1991;214:531–41.
6. Febre JM, Fagot H, Domergne J, et al. Laparoscopic cholecystectomy in complicated cholelithiasis. Surg Endosc. 1994;8:1198–201.
7. Huang SM, Wu CW, Mong HT, et al. Bile duct injury and bile leakage in laparoscopic cholecystectomy.Br J Surg. 1993;80:1590–2.
8. Zucker KA. Quality Publishing Inc; St Louis: 1991. Surgical Laparoscopy; pp. 143–82.
9. Cuschieri A, , Berci G.. Laparoscopic Biliary Surgery.Oxford: Blackwell Scientific Publications, 1992;96–116, 134–2.
10. Schol EPG, Go PM, Gouma DJ. Risk factors for bile duct injury in laparoscopic cholecystectomy; analysis of 49 cases. BrJ Surg. 1994;81:1786–8.
11. Clavien PA, Sanabria JR, Strasberg SM. Proposed classification of complications of surgery with examples of utility in cholecystectomy. Surgery. 1992;111:518–26.
12. Wolfe BM, Gardiner BN, Leary BF, et al. Endoscopic cholecystectomy. Arch Surg. 1991;126:1129–97.
13. Klotz HP, Schlump F, Largiader F. Injury to an accessory bile duct during laparoscopic cholecystectomy.Surg Laparosc Endosc. 1992;2:317–20.
14. Woods MS, Shellito JL, Santoscoy GS, et al. Cystic duct leaks in laparoscopic cholecystectomy. Am J Surg. 1994;168:560–5.
15. Edelman DS. Bile leak from the liver bed following laparoscopic cholecystectomy. Surg Endosc.1994;8:205–7.
16. Bedogni G, Mortilla MG, Ricci E, et al. Meinero M. Ed Masson; Milan: 1994. The role of endoscopic treatment of early biliary complications of laparoscopic cholecystectomy, Laparoscopic Surgery; pp. 145–88.
17. Brandabur JJ, Kozarek RA. Endoscopic repair of bile leaks after laparoscopic cholecystectomy. Semin Ultrasound CT MRI. 1993;14:375–80.
18. Davids PHP, Rauws EAJ, Tytcat GNJ. Postoperative bile leakage: endoscopic management. Gut.1992;33:1118–22.
19. Kozarek RA. Endoscopic treatment of biliary injuries. Gastroenterol Clin North Am. 1993;3:261–70.
20. Neugebauer E, Sauerland S, Troidl S. Springer; Paris: 2000. Recommendations for evidence-based endoscopic surgery; pp. 36–46.
21. Russel JC, Walsh SJ, Mattie AS, et al. Bile duct injuries,1989–1993. A statewide experience. Connecticut Laparoscopic Cholecystectomy Registry. Arch Surg. 1996;131:382–8.
22. Äänimaa M, Mäkelä P. The cystic duct stump and the postcholecystectomy syndrome. Arm Chir Gynaecol. 1981;70:297–303.
23. Duca S. Publishing House Paralela 45; Piteş ti: 2001. Chirurgia Laparoscopică2nd edn; pp. 189–208.
24. Ham JM. Cholecystectomy, Surgery of the Liver and Biliary Tract. In:, vol. I. Edinburgh: Churchill Livingstone, 1988;559–67.

Source of support: Nil

Conflict of interest: None declared