

## CVS is a better approach for Laparoscopic Cholecystectomy

Dr. Abbas Abdul Mahdi Kadhim

AL- Sader Medical City, Department of Surgery, AL Najaf- Governorate /Iraq

Accepted 15 July 2016, Available online 21 July 2016, Vol.4 (July/Aug 2016 issue)

### Abstract

Despite advancement in training and technology since introduction of laparoscopic surgery bile duct injuries remains a two-fold or three more common than in open surgery causing significant morbidity and mortality. Misidentification of the Common bile duct (CBD) during dissection of the Calot's triangle can lead to such injuries. This study included 387 Iraqi patients with diagnosis of cholelithiasis underwent laparoscopic surgery from January 2010 till September 2015, Critical View of safety (CVS) approach has been adopted for all cases. CVS is achieved by creation of a "window" crossed by two structures; Cystic duct and artery. This is achieved by exposing the base of the liver bed and dissecting the upper part of Calot's triangle free of all tissue except for the cystic duct and artery. So the Aim of our study was to evaluate CVS approach for prevention of biliary injuries during laparoscopic cholecystectomy. Our results showed that 387 patients admitted to period from January 2010 to September 2015 then CVS was achieved in 346 (89%) while the remaining 41 cases (11 %) it was difficult to achieve so undergone to complete open .There was no significant immediate or delayed complication in adopting this approach. Meantime of operation was around 57 minutes. So our findings concluded that the CVS approach appears to be safe procedure for gaining a sufficient view of calots triangle before transecting the cystic duct and artery. So we suggest to use this technique as a gold standard method for both complicated and uncomplicated cholelithiasis.

**Keywords:** CVS, Laparoscopic Cholecystectomy etc.

### Introduction

Since its introduction Laparoscopic cholecystectomy has rapidly become the procedure of choice for routine gallbladder removal and is currently the most commonly performed major abdominal procedure in Western countries (SLitwin and Cahan, 2008 ). A National Institutes of Health consensus statement in 1992 stated that laparoscopic cholecystectomy provides a safe and effective treatment for most patients with symptomatic gallstones and has become the treatment of choice for many patients (2. National Institutes of Health, 1992). Laparoscopic cholecystectomy decreases postoperative pain, decreases the need for postoperative analgesia, shortens the hospital stay from 1 week to less than 24 hours, and returns the patient to full activity within 1 week (compared with 1 month after open cholecystectomy) Laparoscopic cholecystectomy also provides improved cosmeses and improved patient satisfaction as compared with open cholecystectomy (Calland *et al.*, 2001 and Straberg *et al.*, 1995).

In the beginning of nineties, several studies showed that CVS should be achieved every time, by dissecting the entire infundibulum off the liver bed and by freeing it of all fatty tissue, both in its dorsal and ventral aspects. This,

in his opinion, would have prevented accidental biliary and vascular injuries, due to uncommon variations, incautious bleeding control, or unclear anatomy. These principles have been ignored until recent years, when standardization of the technique, together with some consistent data, have appeared in the literature, asserting that this way of dissecting the gallbladder pedicle would bear a highly protective role against bile duct injuries. This would be especially important in teaching the approach to the gallbladder hilum. The CVS should be achieved prior to clipping or dividing any tubular structures in a laparoscopic cholecystectomy. Difficulty with identification of the critical view should lead the surgeon to consider performing cholangiography or converting the laparoscopic cholecystectomy into an open procedure. (Calland *et al.*, 2001 and Straberg *et al.*, 1995).

### Material and methods

Totally 387 patients underwent laparoscopic cholecystectomy for symptomatic cholelithiasis since January 2010 till December 2015. Operative procedure was carried out by using of the standard four-port technique; the first port is a 10 mm supraumbilical camera port inserted, Pneumoperitoneum is usually

initiated by use of a Veress needle, in some patients with previous abdominal incisions or umbilical hernia open technique was used. The other three ports are inserted under direct camera vision.

In the CVS technique, cephal traction of the fundus is obtained by the T4 grasper, together with a lateral traction of the infundibulum by the T3 grasper. A complete incision of the serosa is performed both in the medial and lateral aspect of the infundibulum and extended upwards almost to the fundus. The medial incision is performed over the vertical fatty line visible on the gallbladder wall; it usually corresponds to the anterior cystic artery. The medial release of the artery is obtained with electro cautery by dissecting it from the gallbladder wall. The section of Calot's artery (which connects the cystic artery to the cystic duct) permits access to the critical safety triangle, set between the gallbladder wall on the right, the cystic duct inferiorly, and the cystic artery on the left. The entire fatty dissection of this triangle and the mobilization of the infundibulum, both anteriorly and posteriorly, permits visualization of the liver surface through the triangle, well above Ruviers' sulcus, as described by ( Strasberg *et al.*, 1995). The clipping and the section of the duct, next to the gallbladder, the clipping of the artery, and the retrograde dissection of the gallbladder complete the operation. All patients had a sub hepatic drain positioned for 1 day, started oral intake on day 1, and generally were dismissed on the second postoperative day.

**Results**

A total of 387 patients 296 of them were females while the remaining (91) were males. The mean age of all was 48 years (range from 18 to 76 years). Eighteen cases were done as emergencies. Mean operative time was 57 minutes, Patients who underwent conversion to open cholecystectomy before start of dissecting gall bladder due to tense adhesions and non visualization of gall bladder were excluded from this study, CVS was achieved in 346 patients (89%) while 41 (11%) patients the operations was completed by open technique because of difficulty in achieving CVS. No mortalities occurred in this series. morbidity was just 4 cases(1%). Biliary leaks from the cystic duct occur in two patient (0.5%) resolved within two weeks, the other patients has intraoperative hemorrhage controlled with bipolar coagulations and clip application. Intraoperative cholangiography has not been performed.

**Table 1** Based on Level of Gallbladder Inflammation

Level of Inflammation	No.
Cholelithiasis	138
Chronic cholecystitis	231
Acute cholecystitis	18
TOTAL	387

**Table 2** Operative Technique Types

operative technique	No.
CVS	346
Open technique	41
TOTAL	387

**Discussion**

Since its described by Erich Muhe in 1985, laparoscopic cholecystectomy has gained worldwide acceptance within a short period of time to become the gold standard treatment for cholelithiasis (Soper *et al.*, 1994). However, along with all the advantages subsequent upon a minimal invasive procedure, came the inherent drawbacks of performing surgery in a new and unfamiliar way. The incidence of bile duct injuries were definitely increased compared with the open technique (Strasberg *et al.*, 1995). Subsequent improvements in the equipment and refinement in technique, as well as improved training in the laparoscopy, resulted in a progressive decrease of the incidence of these injuries. Nevertheless, global incidence of CBD injury has remained fairly constant around 0.5%,as reported by various meta-analyses studies over a 15-year period. (Deziel *et al.*, 1993). Early reports obtained in the 1990s, suggested that the high injury rates were due in part to the inexperience in this new procedure. This was called the 'learning curve effect'(Davidoff *et al.*, 1992). Also anomalous anatomy and Severity of the underlying disease process has been proved to be an important risk factor. As in its open counterpart, biliary injuries are more likely to occur during difficult surgeries (Schol *et al.*, 1994).It has been suggested that the commonest and most serious causes of CBD injuries is misidentification of biliary anatomy (70-80%) (Hugh *et al.*, 2002). Few methods have been advocated to reduce the incidence of ductal injuries which include: routine performance of intraoperative cholangiography (Hawasli *et al.*, 1993 and Berci *et al.*, 1991) and fundus first technique (Martin *et al.*, and Uyama *et al.*, 1995). Many guidelines have been suggested to avoid misidentification of the ducts including instructions for the direction of traction on the gallbladder (Hunter *et al.*, 1991). In the author's and other opinions, all these methods and guidelines are important but still do not emphasize the key issue of misidentification that results in failure to conclusively identify the cystic duct structure before its division. Furthermore way suggested that 97% of CBD injury were due to visual perceptual illusion leading to identifying the CBD as the cystic duct so deliberately cutting it rather than fault in technical skills thus many operative reports describe operation as routine despite missed injuries (Way *et al.*, 2003).

Strasberg in 2008 identified an "error trap" to avoid, regarding the Infandibular technique, in which the common hepatic duct might be mistaken for the gallbladder wall in severe inflammation. Katkhouda with his team in 2000 suggest the extension of the cystic duct's

dissection to the confluence with the common hepatic duct, to perform what he calls a “visual cholangiography.” Another way to prevent injuries, more frequently performed in open surgery (but also described in Laparoscopic, mostly with the use of ultrasonic sharp dissection (Rosemberg *et al.*, 2005), is the “dome-down” or “fundus-first” technique, often advocated for acute cholecystitis (Rosemberg *et al.*, 2004). The error trap of this technique (following Strasberg) concerns the possible injury to the right hepatic artery, which might be retracted downwards, along with the gallbladder. Strasberg suggested that no clipping or cutting should be done until the Calot's triangle is cleared from all fat to visualized only two structures: the cystic artery and duct (Strasberg *et al.*, 2008). However it was left to the surgeon to decide the safest method to reach this critical view without causing injury. So The CVS should be achieved prior to clipping or dividing any tubular structures in a laparoscopic cholecystectomy. Difficulty with identification of the critical view should lead the surgeon to consider performing cholangiography or converting the laparoscopic cholecystectomy into an open procedure.

So we believe by adherence to standard steps of triangle safety approach can help in preventing misidentification errors particularly in cases when there is chronic inflammations and biliary fusion between cystic duct and common hepatic or cystic duct and common bile duct, as this approach shows only two structures crossing the triangle and ends in the gallbladder which should be clearly separated from the liver bed. Other advantages of this approach carry less risk of vascular or biliary injury as the dissection carry out in area away from the Calot triangle where there is no important ductal or vascular anomalies are present. Upon reviewing the cystic duct and artery anomalies describe in literature most occur at the level of Calot triangle (Strasberg *et al.*, 1995). Our results show that this approach for Laparoscopic cholecystectomy is a safe and prevent injury to the CBD and other biliary passage and take no longer time and increased the confidence, which probably makes the surgeon feel more secure, both with inflamed and un inflamed anatomy. We believe that encouragement of this simple, practical technique might be desirable in training hospitals, residencies, and district hospitals, or anywhere laparoscopic experience might be basic or limited to standard operations (.Khan *et al.*, 2009).

## Conclusion

We concluded that CVS appears to be safe procedure for gaining a sufficient view of calots triangle before transecting the cystic duct and we got that this technique is a gold standard method for laparoscopic cholecystectomy. In addition this technique, which probably makes the surgeon feel more secure, both with inflamed and un inflamed anatomy.

## Acknowledgment

Heartfelt thanks for those working in the department of surgery at AL- Sader Medical city, AL Najaf- Governorate/ Iraq as well as my great thanks to the department of statistics for their helping to accomplish this work.

## References

- [1]. Slitwin DE, Cahan MA. Laparoscopic cholecystectomy, (2008), *SurgClin North Am*, 2008 Dec, 88(6):1295-313.
- [2]. National Institutes of Health (NIH), (1992), Gallstones and Laparoscopic Cholecystectomy. NIH Consensus Statement. NIH. September 14-16.
- [3]. Calland JF, Tanaka K, Foley E, Bovbjerg VE, Markey DW, Blome S, *et al*, (2001), Outpatient laparoscopic cholecystectomy: patient outcomes after implementation of a clinical pathway. *Ann Surg*. May. 233(5):704-15.
- [4]. Strasberg SM, Hertl M, Soper NJ, (1995), An analysis of the problem of biliary injury during laparoscopic cholecystectomy, *J Am Coll Surg*, 180: 101-125.
- [5]. Soper NJ, Brunt LM, Kerbl K, (1994), Laparoscopic general surgery, *N Engl J Med*, ;330:409-19.
- [6]. Strasberg SM, Hertl M, Soper NJ, (1995), An analysis of the problem of biliary injury during laparoscopic cholecystectomy, *J Am Coll Surg*, ;180:101-25.
- [7]. Deziel DJ, Millikan KW, Economou SG, *et al*, (1993), Complications of laparoscopic cholecystectomy: A national survey of 4,292 hospitals and an analysis of 77,604 cases, *Am J Surg*, ;165:9-14.
- [8]. Davidoff AM, Pappas TN, Murray EA, *et al*, (1992), Mechanisms of major biliary injury during laparoscopic cholecystectomy, *Ann Surg*, 215:196-202.
- [9]. Schol FP, Go PM, Gouma DJ, (1994), Risk factors for bile duct injury in laparoscopic cholecystectomy: Analysis of 49 cases, *Br J Surg*, 81:1786-88.
- [10]. Hugh TB, (2002), New strategies to prevent laparoscopic bile duct injury—surgeons can learn from pilots, *Surgery*, 132:2826-3510.
- [11]. Hawasli A, (1993), Does routine cystic duct cholangiogram during laparoscopic cholecystectomy prevent common bile duct injury, *Surgical Laparoscopy and Endoscopy*, 3(4):290-295.
- [12]. Berci G, Sackier JM, Paz-Partlow M, (1991), Routine or selected intraoperative cholangiography during laparoscopic cholecystectomy, *The American Journal of Surgery*, 161(3):355-360.
- [13]. Martin IG, Dexter SPL, Marton J, *et al*, (1995), Fundus-first laparoscopic cholecystectomy, *Surgical Endoscopy*, (2):203-206.
- [14]. Uyama I, Iida S, Ogiwara H, *et al*, (1995), Laparoscopic retrograde cholecystectomy (from fundus downward) facilitated by lifting the liver bed up to the diaphragm for inflammatory gallbladder, *Surgical Laparoscopy and Endoscopy*, 5(6):431-436.
- [15]. Hunter JG, (1991), Avoidance of bile duct injury during laparoscopic cholecystectomy, *The American Journal of Surgery*, 162(1):71-76.
- [16]. Way LW, Stewart L, Gantert W, *et al*, (2003), Causes and prevention of laparoscopic bile duct injuries: analysis of 252 cases from a human factors and cognitive psychology perspective, *Annals of Surgery*, 237(4):460-469.
- [17]. Strasberg SM, (2008), Error traps and vasculo-biliary injury in laparoscopic and open cholecystectomy, *J Hepatobiliary Pancreat Surg*, 15: 284-2928.
- [18]. Katkhouda N, Mavor E, Mason RJ. Visual identification of the cystic duct-CBD junction during laparoscopic cholecystectomy (visual cholangiography). An additional step for prevention of CBD injuries, *Surg Endosc*, 14: 88-89.
- [19]. Fullum TM, Kim S, Dan D, Turner PL, (2005), Laparoscopic “dome-down” cholecystectomy with the LSC-5 harmonic scalpel, *JLS*, 9: 51-4.
- [20]. Rosemberg J, Leinskold T, (2004), Dome down laparoscopic cholecystectomy. *Scandinavian J Surg*, 93: 48-51.
- [21]. Strasberg SM, Hertl M, Soper NJ, (1995), (An analysis of the problem of biliary injury during laparoscopic cholecystectomy, *Journal of the American College of Surgeons*, 180(1):101-125
- [22]. Goor DA, Ebert PA, (1972), Anomalies of the biliary tree. Report of a repair of an accessory bile duct and review of the literature, *Archives of Surgery*, 104(3):302-309.
- [23]. Khan MN, Nordon I, Ghauri AS, Ranaboldo C, Carty N, (2009), Urgent cholecystectomy for acute cholecystitis in a district general hospital: is it feasible, *Ann R Coll Surg Engl*, 91(1): 30-34