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Original Research Article

Efficacy of Critical View of Safety in Laparoscopic Cholecystectomy

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Abstract: ***Background:*** Bile duct injury is the most serious complication of laparoscopic cholecystectomy and misidentification is thought to be the most common cause. CVS is a method of exposure of hepatocystic triangle to minimize this injury. ***Material and methods*:** This prospective cohort study was conducted in the Surgical Deptt Hayatabad Medical Complex from 1st August 2018 to 31st July 2020. ***Results*:** A total of 100 patients were included with 69 females and 31 male patients with age range of 25-70 years and mean age 37 years. The mean procedure time noted was 45 minutes (35-55mins). CVS was achieved in all patients and documented in the form of video or picture as doublet view of hepatocystic triangle. No BDI was noted. Only 01 patient presented with 20ml collection in the gall bladder fossa which was treated conservatively. ***Conclusion*:** Achieving CVS during laparoscopic cholecystectomy is a safe way to minimize BDI. Incarporating CVS into our syllabus and guidelines will promote culture of safe laparoscopic cholecystectomy.

Keywords: CVS, Lap Chole, BDI.

INTRODUCTION

Laparoscopic cholecystectomy is one of the most common procedure performed worldwide [1], but despite this the incidence of complications is 2-5 times more than open cholecystectomy. Overall, 10% of the cases end up having significant complications; of which biliary injury is the most common (0.3-0.5%) [2-4]. These injuries not only cause increased morbidity and mortality of the patient but also results in legal litigations for the operating surgeons [5, 6]. Years of surgical audit has deemed misidentification to be the most common cause of these injuries [7, 8].

In early 1990s, Strasberg introduced the concept of critical view of safety 'CVS' [7]. It is the method of exposure of the hepatocystic triangle to minimize the incidence of misidentification injury, hence improving patient outcomes. It has been adapted from the 2-step principle used for ductal identification in open cholecystectomy. The cystic duct and artery are thoroughly dissected demonstrating that only two structures are entering the gall bladder before being clipped and cut. Over the years attempt was made to replicate and modify this technique for use in laparoscopic surgery [9]. Rather than a dissection method it is more of a final view at the completion of dissection [7, 9, 10]. Any hinderance in establishing the CVS may indicate the need for one of the many bail out procedures that have been described in literature [1, 11, 12].

CVS has been adopted worldwide in order to ensure the practice of safe cholecystectomy and different trials are being performed to prove its efficacy [13-17]. It is of particular importance to the young surgeons and trainees who have a higher probability of causing injuries due to insufficient experience and knowledge [18]. We have complied a series of 100 patients who underwent laparoscopic cholecystectomy in our unit utilizing the principles of CVS with almost negligible complications. Incorporating the CVS into our syllabus and guidelines will not only promote the culture of safe cholecystectomy but also lessen our complications rate.

MATERIAL AND METHODS

This prospective cohort study was conducted in the department of surgery hayatabad medical complex Peshawar from 1st August 2018 to 31st July 2020. A total of 100 patients with age range of 25-70yrs (mean age of 37 years) were admitted through OPD.

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Symptomatic cholelithiasis, acute and chronic cholecystitis, in patients with an ASA I&II were included in the study. Patients with co-morbidities, previous abdominal surgeries and suspected complications were excluded from the study. All patients were discharged on 1st post op day. Follow up was done on 10th post op day wherein an ultrasound was done in case of suspected leak and stitches removed.

PROCEDURE

Baseline investigations including U/S abdomen & pelvis was done and anesthesia fitness ascertained. Informed consent was taken. Surgeries were performed by a single surgeon to avoid surgeon bias. General anesthesia was given and prophylactic antibiotics injected at the time of induction. Patients were placed in reverse Trendelenburg position. 4-ports technique was used for access to the peritoneum. Pneumoperitoneum created and graspers placed. The hepatocystic triangle was cleared from fats and fibrous tissue anteriorly as well as posteriorly obtaining a 360 degrees view (Doublet view "Figure I & ii"). The cystic plate was exposed. At this point timeout was taken and the operative field inspected for establishment of CVS. Affirmation was also obtained from the assisting surgeon. After ensuring that only two structures i.e. cystic duct and artery are entering the gall bladder, clips were applied to both the structures and cut. A photograph was taken both before and after applying clips demonstrating the CVS. A video of the whole procedure was also recorded and stored for future reference. Time taken for the whole procedure was noted and any complications noted were documented. An abdominal drain was also placed through one of the port site in cases where there was excessive bleeding, empyema gall bladder or biliary spillage. It was removed before the patient was discharged. Patients were followed up on post op day 10th.

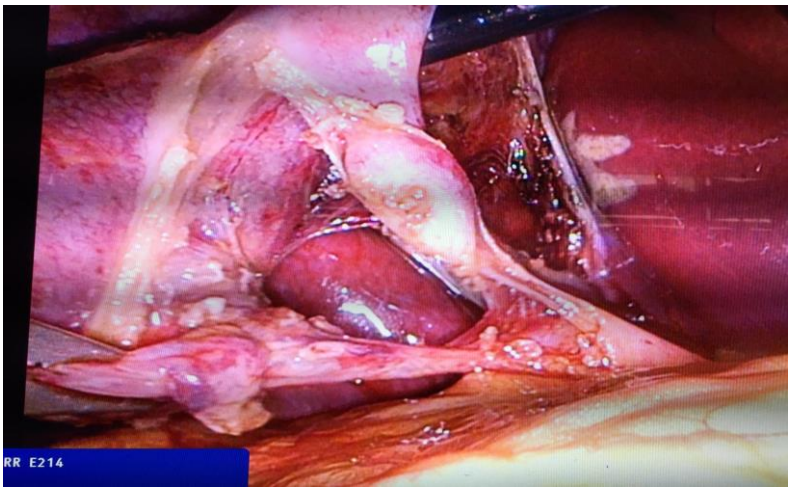

Figure i: Anterior view

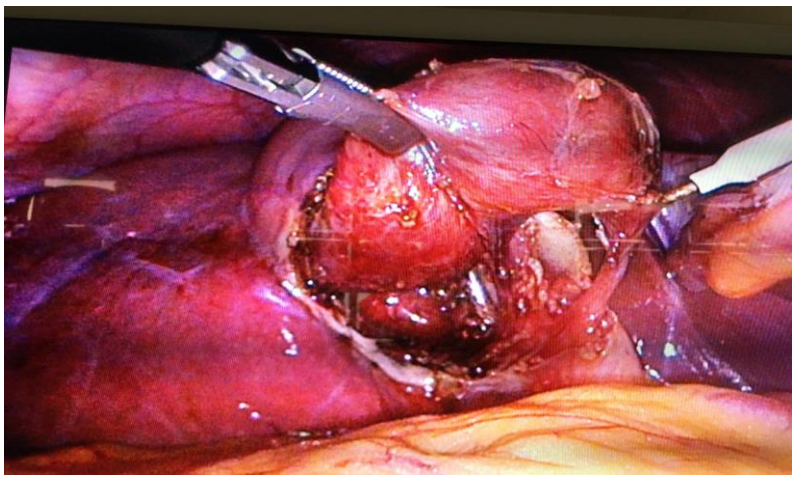

Figure ii: posterior view

RESULTS

A total of 100 patients were admitted through OPD, including 69 (69%) females and 31 (31%) males. 63 (63%) patients had previous history of acute/chronic cholecystitis while 37 (37%) patients had symptomatic gall stones with episodes of mild to moderate biliary colic. The mean procedure time noted was 45 minutes (35-55mins). CVS was achieved and timeout taken in all of the patients. No bile leak was noted in our study. One patient presented with fever and ultrasound showed

a 20ml collection in the GB fossa which was treated conservatively.

DISCUSSION

Almost 50% of the surgeons in USA have dealt with a major bile duct injury during their life time [19]. To reduce the complications rate and accomplish a standardized approach a universal culture of safety in cholecystectomy (COSIC) was adopted [17]. It's basic tenets include:

1. Thorough knowledge of surgical anatomy.
2. Appropriate and timely use of bailout techniques
3. Achieving the critical view of safety (CVS); Remembering error traps
4. Utilization of timeout
5. Use of intraoperative imaging
6. Timely second opinion when needed and
7. Documentation [1, 17].

CVS was deviced in the early 90s, however its acceptance into routine procedure was gradual. It is based on three main principles:

1. The hepatocystic triangle must be cleared of all the fatty and fibrous tissues with or without CBD exposure.
2. Exposure of the lower part of the cystic plate
3. Only two structures i.e. the cystic duct and artery should be seen entering the gall bladder at the end of dissection [7, 9].

These structures should be circumferentially visualized in order to achieve the doublet view [1]. Fulfillment of this criteria minimizes the chances of injuries caused due to misidentification and therefore forms one of the most integral and effective part of culture of safe cholecystectomy. Cholelithiasis more commonly occurs in females. Our study consisted of 69% females and 31% males. A study conducted by Bulent Kava et al 67.5% candidates were female while 32.4% were males supporting our statistics [20]. Inflammation in the hepatocystic triangle secondary to acute/chronic inflammation is one of the main causes of iatrogenic injuries to vasculobiliary tree [21]. 40% of the patients who underwent lap chole had previous history of acute /chronic inflammation while 60% had suffered from mild to moderate episodes of biliary colic. This is in coherence with Bulent's study in which 28.93% of the patients had history of acute/chronic inflammation while the rest had previous episodes of biliary colic [20].

The median time taken by the operating surgeon to perform lap chole was 45 mins. Initially the time taken to establish CVS and perform cholecystectomy was more i.e. 100 mins hence lengthening the operating time. However with experience the duration was shortened to 45 mins. Some studies reported an increase in operating time after they started practicing the CVS technique. Vishvanth & Vettoretto in his study on 90 patients observed that although there was no change in complication rates the mean operative time was reduced after performing CVS [18]. It has been observed in our study that with gain of experience the time taken to establish CVS and perform laparoscopic cholecystectomy lessens to the limit wherein almost no significant difference is found when done without exhibiting CVS.

No major or minor leak was noted in our patients intraoperatively and post operatively. Only one patient had a 20ml collection postoperatively which was treated conservatively with antibiotics hence proving its efficacy in preventing vasculobiliary injuries and lessening the morbidity and mortality associated with it. Vetteretto et al reported a single case of minor leak and no cases with major leak in his study which is comparable to our study [18]. Similarly, Averginos in his study on a large sample size of 988 patients reported a complication rate of 0.5% due to minor leak while no major leak was observed, thus confirming our observations [5]. An error trap observed in our study was the fact that although a picture was taken after viewing CVS, none of the operating notes mentioned establishment of critical view of safety or the timeout taken. In our setup where the operating notes are written mostly by the assisting surgeon, incomplete information will not only be a cause of litigation but also shows the naivety as well as ignorance of the assistant. This is the reason proper documentation including a picture/video has been integrated into COSIC [1, 17].

CONCLUSION

Misidentification is thought to be the most common cause of bile duct injury during laparoscopic cholecystecotmy. Achieving critical view of safety is a safe way to minimize bile duct injuries. Incarporating CVS into our syllabus and guidelines will promote the culture of safe cholecystectomy and prevent bile duct injuries.

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