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Original Research

Assessment of efficacy of achievement of critical view of safety in laparoscopic cholecystectomy in avoiding the occurrence of bile duct injury

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***ABSTRACT*:**
Background: In the modern era of minimally invasive surgery, indications for surgery have become more liberal, resulting in an enormous rise in the number of laparoscopic cholecystectomies performed annually. Direction of traction of gall bladder can lead to misidentification of CBD as cystic duct contributing to CBD injury. The critical view of safety (CVS) is a method of target identification, the targets being the cystic duct and the cystic artery. Many surgeons have a poor understanding of the criteria for CVS, especially those who were not taught CVS during residency. Hence; the present study was conducted for assessing the efficacy of achievement of critical view of safety in laparoscopic cholecystectomy in avoiding the occurrence of bile duct injury. **Materials & methods:** 100 consecutive patients of gallbladder disease were included in the study. Patients were admitted a day prior to surgery in case of elective cholecystectomy from outpatient department (OPD) after complete investigations. Some patients were admitted from emergency with acute cholecystitis. The detail history taking and clinical examination as per Performa was done. After complete investigations and after satisfying inclusion and exclusion criteria of our study, patients were subjected to laparoscopic cholecystectomy. Standard four port method of performing lap cholecystectomy was used. Follow-up details were recorded in Microsoft excel sheet. All the results were analysed by SPSS software. **Results:** Normal Calot triangle anatomy was present in 70 percent of the patients. Mild adhesion was found to be present in 20 percent of the patients while moderate adhesion was found to be present in 10 percent of the patients. Aberrant anatomy was seen in 97 percent of the patients. Critical view of safety was seen in 100 percent of the patients. **Conclusion:** The critical view of safety method of ductal identification is an effective approach according to the best evidence that exists to minimize the risk of BDI during LC.
Key words: Laparoscopic cholecystectomy, Critical view of safety

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INTRODUCTION

Gallstones constitute a significant health problem in developed countries, affecting 10% to 15% of the adult population. Gallstones are common occurrence in northern India. This trend is now showing pan India presence probably because of migration and blending of cultures and lifestyle. Disease usually diagnosed by history of recurrent episodes of right upper quadrant pain or epigastric pain. Three primary methods used to diagnose gallstone disease are ultrasonography, nuclear scanning (cholescintigraphy) and oral cholecystography. Ultrasonography is most often used method these days. Laparoscopic surgery has induced a tremendous revolution in the treatment of gallbladder disease. Open cholecystectomy which has been performed unchallenged for over a century now faces an abrupt end with advent of laparoscopic cholecystectomy.[1- 3]

In the modern era of minimally invasive surgery, indications for surgery have become more liberal, resulting in an enormous rise in the number of laparoscopic cholecystectomies performed annually.

Direction of traction of gall bladder can lead to misidentification of CBD as cystic duct contributing to CBD injury. When hartmann pouch is pulled superiorly instead of laterally, cystic duct and CBD become aligned and appears as a single structure. This deception is more common when cystic duct is short or there is stone in hartmann pouch or in Mirizzi syndrome. Extensive dissection in can lead to devascularisation of bile duct which presents as stricture. These injuries generally have bad prognosis in terms of post-operative morbidity, mortality and successful outcome after remedial surgery. The critical view of safety (CVS) is a method of target identification, the targets being the cystic duct and the cystic artery. Many surgeons have a poor understanding of the criteria for CVS, especially those who were not taught CVS during residency.[4- 6] Hence; the present study was conducted for assessing the efficacy of achievement of critical view of safety in laparoscopic cholecystectomy in avoiding the occurrence of bile duct injury.

MATERIALS & METHODS

The present study was conducted for assessing the efficacy of achievement of critical view of safety in laparoscopic cholecystectomy in avoiding the occurrence of bile duct injury. 100 consecutive patients of gallbladder disease were included in the study. Inclusion criteria for the present study include:
Patients with symptomatic gallbladder diseases

- Symptomatic gallstones
- Acute or chronic cholecystitis
- Mucocele/ Pyocele of gallbladder

Patients were admitted a day prior to surgery in case of elective cholecystectomy from outpatient department (OPD) after complete investigations. Some patients were admitted from emergency with acute cholecystitis. The detail history taking and clinical examination as per Performa was done. After complete investigations and after satisfying inclusion and exclusion criteria of our study, patients were subjected to laparoscopic cholecystectomy. Standard four port method of performing lap cholecystectomy was used. Follow-up details were recorded in Microsoft excel sheet. All the results were analysed by SPSS software. Chi- square test and paired t test were used for assessment of level of significance. P-Value of less than 0.05 was taken as significant.

RESULTS

Mean age of the patients was 48.5 years. Majority of the patients belonged to the age group of 41 to 50 years. Pain was the most common clinical symptom encountered in patients in the present study found to be present in 100 percent of the patients. Dyspepsia and vomiting were the next in number found to be present in 45 percent and 5 percent of the patients. 76 percent of the patients of the present study were females, while the remaining 24 percent were males. Mean levels of serum SGOT, SGPT, total bilirubin and alkaline phosphatase were 28.4 IU/L, 29.7 IU/L, 0.74 mg/dL and 69.7 IU/L respectively. Normal Calot triangle anatomy was present in 70 percent of the patients. Mild adhesion was found to be present in 20 percent of the patients while moderate adhesion was found to be present in 10 percent of the patients. Aberrant anatomy was seen in 97 percent of the patients. Critical view of safety was seen in 100 percent of the patients.

Table 1: Distribution of subjects according to age group

Age-group (years)	Frequency	Percentage
18- 30	15	15
31- 40	13	13
41- 50	41	41
51- 60	19	19
61 and above	12	12
Total	100	100

Table 2: Descriptive results

Parameter	Mean
SGOT (IU/L)	28.4
SGPT (IU/L)	29.7
Total bilirubin (mg/dL)	0.74
Alkaline phosphatase (IU/L)	69.7

Table 3: Distribution of patients according to Calot triangle anatomy

Calot triangle access	Frequency	Percentage
No adhesion present	70	70
Minimal to Mild adhesion	20	20
Moderate adhesion	10	10
Total	100	100

Table 4: Distribution of patients according to aberrant anatomy

Aberrant anatomy	Frequency	Percentage
Yes	3	3
No	97	97
Total	100	100

Table 5: Achievement of Critical View of safety

Critical view of safety	Frequency	Percentage
Achieved	100	100
Total	100	100

DISCUSSION

Adequate and proper training in a laparoscopic surgery, delineation of biliary anatomy in Calot's triangle (critical view) by careful surgical dissection, and if needed be by intra-operative cholangiography (IOC), judicious use of electro cautery, avoiding blind application of clips and cautery in case of bleeding in the Calot's triangle are some of the measures to avoid a bile duct injury. The primary cause of error according to one report was visual perceptual illusion in 97% of the cases. Fault in technical skill was present in only 3% of the injuries. Knowledge and judgment error contributed but were not the primary cause.[6- 9] Hence; the present study was conducted for

assessing the efficacy of achievement of critical view of safety in laparoscopic cholecystectomy in avoiding the occurrence of bile duct injury.

In the present study, mean age of the patients was 48.5 years. Majority of the patients belonged to the age group of 41 to 50 years. Pain was the most common clinical symptom encountered in patients in the present study found to be present in 100 percent of the patients. Dyspepsia and vomiting were the next in number found to be present in 45 percent and 5 percent of the patients. 76 percent of the patients of the present study were females, while the remaining 24 percent were males. Mean levels of serum SGOT, SGPT, total bilirubin and alkaline phosphatase were 28.4 IU/L, 29.7 IU/L, 0.74 mg/dL and 69.7 IU/L respectively. Giménez ME et al performed a survey to assess the awareness of the CVS, estimating the proportion of surgeons that correctly identified its elements and its relationship with BDI. An anonymous online survey was sent to 2096 surgeons inquiring on their common practices during cholecystectomy and their knowledge of the CVS. A total of 446 surgeons responded the survey (21%). The percentage of surgeons that correctly identified the elements of CVS was 21.8% and 24.8% among surgeons claiming to know the CVS. The percentage of surgeons that reported BDI was higher among those that incorrectly identified the elements of the CVS. In the multivariate analysis, career length was the most significant factor related to BDI. The percentage of surgeons that correctly identified the Critical View of Safety was low, even among those who claimed to know the CVS. The percentage of surgeons that reported BDI was higher among those that incorrectly identified the elements of the CVS.[9]

In the present study, Normal Calot triangle anatomy was present in 70 percent of the patients. Mild adhesion was found to be present in 20 percent of the patients while moderate adhesion was found to be present in 10 percent of the patients. Aberrant anatomy was seen in 97 percent of the patients. Critical view of safety was seen in 100 percent of the patients. Singh R et al undertook a prospective study in 1340 patients having two groups, Group-A (CVS-700 patients) and Group-B (Infundibular technique - 640 pts). Patients in both the groups were of similar case mix. Group-A had two surgeons (Jr. Consultant 50-100LC and Sr. Surgeon >12000LC experience) and Group B (four surgeons having >100LC experience). CVS was achieved in 98.1% of pts and there was no conversion, bile leak and BDI (group-A). Where as in Group-B- 32 conversion, 5 BDIs occurred and out of which 3 were major BDIs. The operating time taken in Group-A (approx. 90-110minutes) was significantly higher than group-B (60-80 minutes). CVS documentation by DVD recording and OT notes were found to be equally good compared to photographs.[10] Zarin M et al assessed whether CVS technique is faster and safer compared to conventional infundibular technique. Total of 438 patients were divided into two groups. Group-A in which LC was done using infundibular while in Group-B, CVS technique was utilized. Two groups were compared for operating time and BDI. The operative time was significantly reduced for LC using CVS technique (50 mins vs. 73 mins). Minor leaks were comparable but there was a significant difference in major LEAKS between the two techniques. Although the "critical view of safety" requires more dissection as compared to infundibular technique, but once learnt and mastered, it is faster and safer identification technique during laparoscopic cholecystectomy.[11]

CONCLUSION

The critical view of safety method of ductal identification is an effective approach according to the best evidence that exists to minimize the risk of BDI during LC.

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