Assessment of routine use of critical view of safety in laparoscopic cholecystectomy, prospective cohort study

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Background
The reported frequency of biliary injuries has tripled to 0.4% since the advent and widespread usage of laparoscopic cholecystectomy in the 1990s. The goal of this study: in terms of practicality and safety, is to evaluate the effectiveness of a critical perspective on safety during laparoscopic cholecystectomy.

Patients and Methods
This prospective cohort research included 100 patients who received laparoscopic cholecystectomy between 2018 and 2021 at Assiut University Hospital and Assiut Police Hospital.

Results
According to the data, just one individual out of 100 suffered from bleeding, another from a bile leak, and no one suffered from liver or viscus damage.

Conclusion
The most secure approach to comprehend the triangle's design is from the vital aspect of safety, and understanding so significantly aids in the prevention of ductal harm. Significant bile duct damage and accompanying complications may be avoided by employing Critical View of Safety in clinical practice.

Keywords:
patient Safety, Calot's Triangle, and laparoscopic cholecystectomy

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Introduction

A number of factors, including patient characteristics (obesity, older age, male gender, and adhesions), local factors (severe gallbladder inflammation/infection, aberrant architecture, and bleeding), and surgeon experience, have been shown to influence the likelihood of biliary damage during lab cholecystectomy [1].

The most serious bile duct injury occurs when the common bile duct is misidentified as the cystic duct [2].

Calot's triangle anatomy must be vigorously sought out to reduce biliary damage. Many surgeons now utilize a method developed by Strasberg in 1995 called 'critical view of safety' (CVS) to lower the risk of biliary damage [3] during surgery.

Calot's triangle must be fat-free, the gallbladder must be isolated from the cystic plate, the liver must be visible, and only two structures—a duct and an artery—should enter the gallbladder (together, "2 structures") [4].

According to the research, bile duct damage is uncommon with this method. More research is needed to determine the benefits and drawbacks of this strategy [5].

Patients and methods

The study was approved and monitored by the medical ethics committee, Assiut faculty of medicine. IRB: 17100604

This prospective cohort research included 100 patients who received laparoscopic cholecystectomy between 2018 and 2021 at Assiut University Hospital and Assiut Police Hospital.

Regarding ethics

(1) Acceptance by the Assiut University School of Medicine's Ethical Review Committee.
(2) Patients' signed, written consent.

Third, there were no conflicts of interest in the subsequent research and publication.

Fourth, individuals may opt out of the experiment at any moment.

Parties affected

Every patient who underwent a laparoscopic

cholecystectomy was considered for inclusion. 1) Emergency liver cirrhosis, cholecystectomy, laparoscopic surgery, HCV and HBV case number two 4) Inability to visit the CVF.

Study materials

A thorough medical history should be taken, including the patient's biliary colic symptoms (such as frequency of attacks), any history of acute cholecystitis (such as colic, fever, nausea, and vomiting, as well as hospitalization), any history of jaundice, any history of cholangitis (such as fever, rigors, and jaundice), and any history of pancreatitis (such as fever, upper abdominal pain radiating to the back).

Check for deep palpation, deep inspiratory arrest, maximum tenderness, rebound tenderness, guarding at the right hypochondrium (Murphy's Sign), and other abnormalities in the right upper quadrant of the abdomen on a global and regional basis.

Prothrombin time, concentration, and international normalized ratio (INR), hepatitis indicators, complete blood count, and random blood sugar are a few examples of tests that might be performed in a lab.

Abdominal ultrasound imaging to detect gallbladder (GB) polyps, gallstone content, and gallstone stone count. Resonance Magnetic cholangiopancreatography (MRCP) is used to identify biliary leakage and jaundice in the early aftermath of surgery. Patients must undergo an examination and follow-up ERCP (endoscopic retrograde cholangiopancreatography) before and after surgery.

Technique

(1) All research participants had standard laparoscopic operations.

Two 1.2 gram IV doses of clavulanic acid and amoxycillin were given 30 minutes before the procedure.

Three: the patient is laying on his back in the operating area, which has shackles and a gel pad to keep him still. In the North American position, the scrub nurse is on the right at the foot end, the scrub surgeon is on the left, and knee-high pneumatic gear is employed in high-risk cases. Arm boards supported the patient's arms, which were tucked beneath the body.

4 - Patients were evaluated for intra-access risk factors such as intraoperative adhesions around the gallbladder, the ability to hold the gallbladder, the presence of pus/bile outside the gallbladder, a distended gall bladder, the size of the impacted stone, gallstones, intra-abdominal adhesions obstructing access, and cholecystitis with impending rupture with pus.

To expedite their recovery, all patients had fast-track surgery, were given patient-controlled anesthesia, had their bowel sounds restored, had their drain output monitored, were hospitalized, and their postoperative result (complications, readmissions, morbidity, death) was reported. They were also watched for signs of infection or problems for up to a month.

Analytical statistics

Before entering the data into SPSS 20, it was gathered, edited, and coded. When their distribution was determined to be parametric, quantitative data were shown as means, standard deviations, and ranges, and qualitative values as raw numbers and percentages.

A 95% confidence interval and a 5% margin of error were used. As a result, the *P* value was calculated as follows:

The degrees of importance are as follows: *P* 0.05 equals S, *P* 0.001 equals HS, while *P* > 0.05 is NS.

Results

The age range of the participants in this research varied from 20 to 63 (mean = 43.35). The mean body mass index (BMI) of the patients, who ranged from 20 to 35 and comprised 87.0% of women and 13.0% of males, was 30.05 2.89. There was 12.0% DM and 13.0% HTN in 23 cases (23%). The percentage of GB polyps was 5.0% (5 occasions), whereas the percentage of stones was 95 (95%).

There were no complaints of liver or viscus damage or the requirement for hospitalization during the experiment.

The average procedure in this research took an hour, and the average amount of blood lost during surgery was assessed to be 150 cc.

Complexity-analyzed case distribution

No. %

Hemorrhage 1 1.0 %

Bile leak 1 1.0 % [Table 1]

During the study one case was recorded to have an intra-operative hemorrhage, which was controlled by ligation of the cystic artery and using gel foam, another case recorded post-operative bile leak about 200 cc, reduced in volume in 3 days until clear drain.

Table 1 Distribution of the studied cases according to complication

	Number (%)
Hemorrhage	1 (1.0%)
Bile leak	1 (1.0%)

Discussion

The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) recently recognized the Critical View of Safety as important and advocated for its inclusion in the "Safe Cholecystectomy Program" to reduce the risk of Bile Duct Injury and to establish a consistent culture of safety during cholecystectomy. Despite extensive usage of CVS, no substantial reduction in the BDI has been seen. There is much dispute on the efficacy of this technique in avoiding BDI [6].

Several studies have demonstrated that using CVS on a daily basis may minimize or even eliminate the occurrence of bile duct injury (BDI); however, these studies are limited by the absence of a control group. Other studies demonstrate that CVS is not connected with a beneficial and precise usage in clinical practice [7,8], which calls the scientific consensus for the treatment into question.

The purpose of this prospective cohort research is to objectively assess the safety of laparoscopic cholecystectomy.

Our findings are consistent with those of Elwan (2019) [9], who sought to investigate the role of extrahepatic landmarks in avoiding typical bile duct damage. They noticed that each patient had a complete safety assessment. There was no major bleeding throughout the procedure. The median time for surgical procedures was 40 minutes (with a range of 20 to 75 minutes). There were no reports of bile duct damage, no matter how little or severe, during or after operation. For wound infections, two patients (0.7%) required antibiotics and daily dressing changes, and one patient (0.3%) had postoperative pancreatitis that required just conservative therapy. Due to severe adhesions that prevented laparoscopic dissection, two patients (0.7%) required open cholecystectomy. There were 195 (65%) same-day discharges, 95 (31.7%) second-day discharges, and 10 (3.3%) third-day discharges among surgical patients. During the surveillance period, there were no deaths.In a research conducted by Heistermann *et al*. (2006) [10], 100 patients who had laparoscopic cholecystectomy were reported. The research team's main purpose was to demonstrate that it is possible to get a critical perspective on security and record it using photos. According to photographic evidence from a critical standpoint on safety, 97 out of 100 cholecystectomies were successfully conducted laparoscopically, despite the presence of acute cholecystitis and prior abdominal procedures. A cystic duct stump rupture caused a biliary leak as the only surgical consequence.

Two patients suffered intraoperative hemorrhages that were managed with bipolar coagulation and clip applications, according to Vettoretto *et al*. (2011) [11]; one of these patients needed blood transfusions. The treatments' lengths varied substantially. The CVS method was selected because to its shorter average time divided by case complexity (as determined by the degree of gallbladder inflammation) and shorter median time (51.5 minutes vs. 69.7 minutes). In their retrospective cohort analysis, they critically examined the safety triangle technique and compared it to the infundibular approach.

Between 2002 and 2006, Yegiyants and Collins (2008) [12] performed laparoscopic cholecystectomy on 3042 patients employing CVS for ductal identification. One of these individuals had a ductal damage.

These studies give compelling evidence of CVS's effectiveness. Several studies support CVS for LC, despite the fact that they only have a low level of evidence for assessment by evidence-based practice. CVS does not result in a reduction in BDI, according to Level 1 evidence. Several case studies show that once at the CVS, the frequency of BDI decreases. According to the data, CVS is the "safest" gallbladder removal method among laparoscopic approaches. Target identification using CVS was not used in research investigating the pathogenesis of significant biliary damage [13].

According to a multicentric study conducted in Italy between 2017 and 2019 by 30 institutions on 604 patients, the CVS is the safest method for identifying the Calot triangle's components and, when done correctly, has a significant influence on reducing the risk of intraoperative complications [14].

Shaheed *et al*.'s study from 2016 [15] attempted to analyze the value of a critical perspective on safety during laparoscopic cholecystectomy in order to solve the problem of avoiding bile duct injury during the infundibular dissection operation. There were no reports of BDI in the CVS group, while four cases (1.6%) were found in the IT group.

Numerous studies [16,17] have shown that CVS is a straightforward technique for lowering BDI rates.

CVS success rates, on the other hand, were much lower than planned and varied substantially between

schools [18,19]. The factors of CVS's poor performance have received little attention. CVS's success rate is now mediocre. Only 9% of the 1,051 LC surgical recordings studied from 31 surgeons revealed that all three CVS criteria were met in the cases. Furthermore, there was no difference in CVS success between mild and severe cases [18]. A preliminary CVS accomplishment rate of 15.9% was observed in 172 people [19] in a French surgical improvement study. Despite the fact that surgeons provided records of successful surgeries, Jin *et al.* (2022) [20] reported that the success rates for CVS in the non-inflammatory group were only 18.18% and 9.84% in the inflammatory group. These data demonstrated that poor CVS performance was a worldwide issue, necessitating more research to improve accomplishment rates.

Only 18.7% of LC where this was indicated as accomplished in the operation note [21] had video verification of CVS, according to a Dutch research.

Conclusion

The most secure approach to analyzing the triangle's construction is from the aspect of safety, which greatly assists in avoiding ductal damage. Significant bile duct damage and accompanying complications may be avoided by employing CVS in clinical practice.

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Conflicts of interest

There are no conflicts of interest.

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