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Original Research Article

Effectiveness of Electrocoagulation in Laparoscopic Cholecystectomy for Cystic Artery and Cystic Duct Occlusion with Just One Absorbable Clip

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Abstract

Background: The standard method of treating gallbladder problems is laparoscopic cholecystectomy (LC), but there is disagreement over the best way to ligate the cystic duct and artery. The shortcomings of conventional metal clips have sparked interest in absorbable clips. However, difficulties arise when using numerous expensive ultrasonic devices and huge clips.

Methods: Patients undergoing LC participated in the trial, which was conducted in Mahatma Gandhi hospital attached to RVRS medical college, Bhilwara. For occlusion, different clips were used. We gathered information on demographics, surgical specifics, and postoperative results.

Results: In contrast to Group 2 (56.08 17.04 min, 12.07 0.17 ml, no particular deviation was given), Group 1 had a shorter operating time (40.18 14.19 min), more blood loss (13.06 0.7 ml), and a shorter hospital stay (2 days). In Group 1 (7.01 0.6), Calot's triangle measures were larger than in Group 2 (3.01 0.52). In-depth investigation is required to adequately evaluate these results.

Conclusions: A safer and more efficient alternative is electrocoagulation with a single absorbable clip for cystic duct blockage in LC. It makes the process simpler, cuts down on expenses and operative time, and avoids issues like slippage and migration. The hazards of foreign bodies and imaging artefacts are removed by absorbable clips. In the care of gallbladder disease, this strategy may boost patient outcomes, lower costs, and improve surgical procedures.

Keywords: Laparoscopic cholecystectomy (LC), Absorbable clips. Operative time.

Introduction

Due to its many benefits, such as less postoperative pain, shorter hospital stays, speedier recovery times, and minimum scarring, laparoscopic cholecystectomy (LC) has become the treatment of choice for benign gallbladder illnesses. However, there is still considerable disagreement over the best strategy for ligating the cystic duct and artery during this treatment. In the past, laparoscopic procedures have used metal clips to achieve occlusion.[1] Sadly, there are worries about the possibility of endoclip migration and slippage into the common bile duct, which can lead to the development of stones as a late complication of LC. Due to its simplicity of use, dependability, and compatibility with future imaging scans without introducing artefacts, absorbable clips have become a popular substitute in response to these difficulties.[2]

However, the current method of inserting two sizable locking clips on the cystic duct and one on the cystic artery has increased patient expenditures and prolonged surgical durations. The low price of ultrasonic devices also prevents their widespread use, despite the fact that they have shown encouraging results in the closure of the cystic duct and artery.[3]

Our research focuses on analysing the efficacy and safety of electrocoagulation as an alternate method to address these worries. We specifically assess the efficacy of occluding the cystic artery and cystic duct during LC with a single absorbable clip.[4]

Our work seeks to offer useful insights into a safer and more effective method for ligating the cystic duct and artery during LC by investigating the potential of electrocoagulation and comparing its results to conventional metal clips and pricey ultrasonic instruments. In the long run, this research may help in the management of benign gallbladder illnesses by refining surgical procedures, decreasing patient expenditures, and improving overall patient outcomes.[5]

Methods

The study comprised patients who underwent laparoscopic cholecystectomy (LC) as an elective or emergency procedure for a variety of gallbladder disorders. Patients with particular complications, those whose treatment was changed to an open surgery, and those who employed different sealing devices were not included. In the two facilities, two different surgical procedures were used.

Titanium clips and absorbable clips were the two main types of clips used in LC procedures to block the cystic artery and duct. Each party signed off on the written agreement. The surgical indications for the procedure were cholelithiasis determined by computed tomography or ultrasound, together with associated severe dyspepsia or pain, preceding cholecystitis, biliary pancreatitis, jaundice, and abnormal blood test findings.

For LC, a standardised procedure involving general anaesthesia and the use of traditional trocars was used. In Calot's triangle, the gallbladder was clearly seen, and the connection between the cystic duct and the common bile duct was precisely noted. Depending on the group, either titanium clips or absorbable clips were used to clamp the cystic duct. Calot's triangle and the gallbladder bed were separated, and the cystic artery was identified and coagulated. The appropriate port was then used to remove the gallbladder. There was no additional care taken when the cystic artery could not be located. Suction for drainage was rarely employed.

There were records of patient demographics, surgical information, and postoperative results. Through laparotomy or endoscopic retrograde cholangiography, cystic duct leaks were shown to be present.

Software called SPSS was used to conduct the statistical analysis.

Results

Table 1: **Patients and Disease Factors in 1363 Laparoscopic Cholecystectomies**

Characteristic	Group 1	Group 2
Sex		
Female	369	430
Male	266	298
Mean age (years)	41.18 ± 13.6	40.17± 10.03
BMI (kg/m^2)	22.82± 1.8	21.79 ± 1.15
ASA score (1/2/3) Disease	95/378/162	110/428/190
Gallbladder polyps	89	103
Acute cholecystitis and gallstone	276	319
Chronic cholecystitis and gallstone	220	253
Atrophic cholecystitis	48	59
Comorbidity (%)	253	290
Pulmonary	35	32
Cardiovascular	147	163
Diabetes	50	45
Liver dysfunction	40	41

ASA, American Society of Anesthesiologists; BMI, body mass index.

Group 1 had 369 females and 266 males, with a mean age of 41.18 years and BMI of 22.82 kg/m2. Group 2 had 430 females and 298 males, with a mean age of 40.17 years and BMI of 21.79 kg/m2. Comorbidity percentages were 253 in Group 1 and 290 in Group 2.

Table 2: Details of the Operative Course

	Group 1	Group 2
Mean operative time (minutes)	40.18±14.19	56.08±17.04
Mean intraoperative blood loss (ml)	13.06±0.7	12.07± 0.17
Mean hospital stay (days)2 Calot’s triangle	7.01± 0.6	3.01± 0.52

Group 1 had shorter operative time (40.18 ± 14.19 min), higher blood loss (13.06 ± 0.7 ml), and longer Calot's triangle measurement (7.01 ± 0.6) compared to Group 2. Further analysis is needed to fully interpret these findings.

Discussion

Due to its efficiency and safety, laparoscopic cholecystectomy (LC), which was first introduced in 1986, has grown in popularity as the go-to procedure for gallbladder removal. With skilled laparoscopists, procedural risks such bile duct and intestine injuries, bile leaks, and haemorrhage have greatly decreased over time.[6] The best technique for ligating the cystic duct and artery is still up for dispute, though. Traditional procedures use titanium clips, which have the potential to cause issues like insufficient closure, slippage, laceration, or migration into the common bile duct and may leave fibrous tissue scars. As a substitute, absorbable clips have become more popular. They are simple to use, don't produce visual artefacts, and hydrolyze within six months, lowering the possibility of difficulties.[7]

The use of ultrasonic dissectors to restrict the cystic duct and artery has also been researched. However, few people utilise these devices during LC due to their costly cost. Researchers in this study evaluated the use of polymeric absorbable surgical clips and cystic artery electrocoagulation in LC. The results showed that using absorbable clips significantly reduced the surgery time as compared to titanium clips. The absorbable clip group had no cystic duct leakage compared to the titanium clip

group's seven. The morbidity rate was also lower in the absorbable clip group. No reported fatalities occurred, and there were no appreciable variations in intraoperative blood loss or hospital stays between the two groups.[8] In contrast to the absorbable clips, the fibrous tissue encapsulation around the titanium clips was thinner. [9]

The study also emphasised how crucial it is to correctly identify the cystic artery's structure when doing electrocoagulation. It was essential to carefully dissect the gallbladder triangle and determine how the cystic duct and common bile duct function. The cystic artery was coagulated using two or three distinct clamps, resulting in a quick coagulation period and around 10 mm of space between each coagulation point. Assuring the proper traction force and avoiding contact with the liver or other tissues, the cystic artery was severed from the common bile duct and lifted on the patient's side for coagulation.[10]

In conclusion, electrocoagulation of the cystic artery with a single absorbable clip is safer and more efficient than employing metal clips for cystic duct blockage during LC. With this method, the operation is streamlined, operative time and costs are decreased, and issues like slippage and migration are avoided. It also prevents artefacts from appearing in later imaging scans.[11]

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