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Comparative of Cystic Artery Cliping vs Cystic Artery Coagulation by Bipolar Force During Laparoscopic Cholecystectomy in Cases of Chronic Cholecystitis

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ABSTRACT
To compare cystic artery cliping vs cystic artery coagulation by bipolar force during laparoscopic cholecystectomy in cases of chronic cholecystitis. One hundred ten cholelithiasis patients who underwent laparoscopic cholecystectomy of both genders were equally (55) into two groups. Each group had 55 patients. Clinical diagnosis, cystic artery number, cystic artery origin, discharge and complications etc. was recorded. Out of 110 patients, males comprised 50 (45.4%) and females 60 (54.6%). Diagnosis in group I and group II patients was biliary colic in 14 and 18, acute cholecystitis in 30 and 22, gall bladder empyema in 6 and 9, gall bladder mucocele in 5 and 6 respectively. Cystic artery number was single in 38 and 42, branched in 10 and 9 and absent in 7 and 4 patients respectively. Cystic artery origin was right hepatic artery in 42 and 40, superior mesenteric artery in 5 and 12 and other variations in 8 and 3 patients in group I and II respectively. Forty six patients in group I and 42 patients in group II were discharged on 1 day and 9 patients in group I and 13 patients in group II were discharged in 2 days. The difference was significant ($p<0.05$). Complications recorded were intra-operative hemorrhage in 2 in group I and 3 in group II and bile leak in 0 in both groups. Results from bipolar electrocautery technique are equivalent to those from the traditional clip technique.

INTRODUCTION

Muhe[1] performed the first laparoscopic cholecystectomy in 1986. The gold standard for the treatment of symptomatic gallstones is currently laparoscopic cholecystectomy. In the beginning, this novel procedure was linked to a marked rise in morbidity, particularly iatrogenic biliary damage and arterial bleeding. In contrast to open surgery, anatomical relationships are observed differently during laparoscopic visualization[2,3]. In order to prevent harm to the extra-hepatic biliary tree the surgeon must perform painstaking dissection and rely on his thorough understanding of the variances in Calot's triangle. The cystic artery in Calot's triangle has a varied length and path[4].

With the potential for bile leakage and other consequences, clips have the ability to slip, detach, ulcerate, migrate, internalize and cause necrosis of the cystic duct[5]. Different kinds of hemostatic devices are now employed in place of clips in new procedures. Monopolar electrocautery, bipolar electrocautery, an ultrasonic coagulator and the Ligasure vascular sealing system are hemostatic tools used in laparoscopic cholecystectomy[6]. Although monopolar electrocautery is less safe than ultrasonic coagulation and Ligasure, they are not always available in hospitals[7,8]. We performed this study to compare cystic artery cliping vs cystic artery coagulation by bipolar forcep during laparoscopic cholecystectomy in cases of chronic cholecystitis.

MATERIALS AND METHODS

After considering the utility of the study and obtaining approval from ethical review committee, we selected one hundred ten cholelithiasis patients who underwent laparoscopic cholecystectomy of both genders. Patient's consent was obtained before starting the study. Data such as name, age, gender, etc. was recorded. Each patient underwent a complete physical examination as well as a detailed history evaluation. Investigations included a full blood count, routine urine testing, serum urea and creatinine, random blood sugar, liver function tests, hepatitis screenings and abdominal ultrasounds were carried out. Based on the intra-operative width of the cystic artery, two groups were created. Each group had 55 patients. Clinical diagnosis, date of operation, co-morbidities/previous surgery, cystic artery number, cystic artery origin, discharge and complications etc. was recorded. The results were compiled and subjected for statistical analysis using Mann-Whitney U test. $p<0.05$ was set significant.

RESULTS

Out of 110 patients, males comprised 50 (45.4%) and females 60 (54.6%) (Table I). Diagnosis in group I and group II patients was biliary colic in 14 and 18, acute cholecystitis in 30 and 22, gall bladder empyema in 6 and 9, gall bladder mucocele in 5 and 6 respectively. Cystic artery number was single in 38 and 42, branched in 10 and 9 and absent in 7 and 4 patients respectively. Cystic artery origin was right hepatic artery in 42 and 40, superior mesenteric artery in 5 and 12 and other variations in 8 and 3 patients in group I and II respectively. Forty six patients in group I and 42 patients in group II were discharged on 1 day and 9 patients in group I and 13 patients in group II were discharged in 2 days. The difference was significant ($p< 0.05$) (Table 2, fig I). Complications recorded were intra-operative hemorrhage in 2 in group I and 3 in group II and bile leak in 0 in both groups (Tabe 3).

DISCUSSIONS

Laparoscopic cholecystectomy is a minimally invasive surgical procedure performed to remove the gallbladder[9,10]. The gallbladder is a small organ located beneath the liver and its primary function is to store bile, which is produced by the liver and used to aid in the digestion of fats[11,12]. When the gallbladder becomes inflamed, develops gallstones or experiences other problems, it may need to be removed, which is typically done through cholecystectomy[13,14]. We performed this study to compare cystic artery cliping vs cystic artery coagulation by bipolar forcep during laparoscopic cholecystectomy in cases of chronic cholecystitis.

Our results showed that out of 110 patients, males comprised 50 (45.4%) and females 60 (54.6%). Imran *et al.*[15] studied 600 patients who underwent laparoscopic cholecystectomy. In our study, diagnosis in group I and group II patients was biliary colic in 14 and 18, acute cholecystitis in 30 and 22, gall bladder empyema in 6 and 9, gall bladder mucocele in 5 and 6 respectively. Cystic artery number was single in 38 and 42, branched in 10 and 9 and absent in 7 and 4 patients respectively. Cystic artery origin was right hepatic artery in 42 and 40, superior mesenteric artery in 5 and

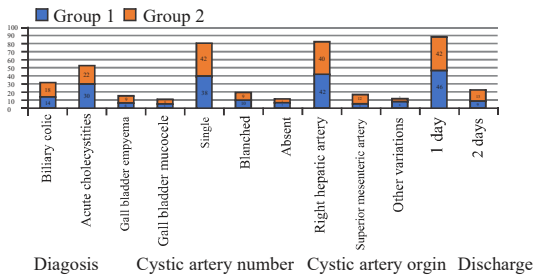

Fig. 1:Comparison of parameters.

Table 1: Patients distribution

Total-110

Gender	Males	Females
Number (%)	50 (45.4%)	60 (54.6%)

Table 2: Comparison of parameters

Parameters	Variables	Group I	Group II	p-value
Diagnosis	Biliary colic	14	18	0.05
	Acute cholecystitis	30	22	
	Gall bladder empyema	6	9	
	Gall bladder mucocele	5	6	
cystic artery number	Single	38	42	0.81
	branched	10	9	
	Absent	7	4	
cystic artery origin	Right hepatic artery	42	40	0.73
	Superior mesenteric artery	5	12	
	Other variations	8	3	
Discharge	1 day	46	42	0.91
	2 days	9	13	

Table 3: Assessment of complications

Complications	Group I	Group II	p-value
Intra-operative hemorrhage	2	3	0.84
Bile leak	0	0	1

12 and other variations in 8 and 3 patients in group I and II respectively. Forty six patients in group I and 42 patients in group II were discharged on 1 day and 9 patients in group I and 13 patients in group II were discharged in 2 days. Imran *et al*.[16] compared bipolar electrocautery with clip application for securing hemostasis of cystic artery in patients undergoing laparoscopic cholecystectomy. In 306 cases assigned to group 1 the cystic artery was clipped while in 294 cases assigned to group 2 the cystic artery was coagulated with monopolar electrocautery. In group 1 the cystic artery was single in 91%, branched in 6% and absent in 3% cases while in group 2 the cystic artery was single in all cases. The cystic artery was of normal size in 82%, short in 7%, long in 8% and absent in 3% cases in group 1 while in group 2, it was normal in size in 88%, short in 3% and long in 9% cases. The cystic artery was originating from the right hepatic artery in 97% cases and from the superior mesenteric artery in 3% cases in group 1. In group 2 the cystic artery was originating from the right hepatic artery in 97% cases and not visualized in 3% cases. In group 1, only 3 patients had an intra-operative hemorrhage while in group 2, 3 of the patients had bleeding. The post-operative recovery was also similar in both groups with 83% and 81% patients going home on the next day.

Our results showed that complications recorded were intra-operative hemorrhage in 2 in group I and 3 in group II and bile leak in 0 in both groups. We observed bile duct injury in our study but no case of bile leak was observed in any group. In a study by Emmi *et al*.[17] the cystic artery was controlled using bipolar electrocautery in 30 patients (group B) and by surgical clips in 30 patients (group A). In both groups, the length of stay in the hospital and the duration of surgery were similar. In Group A, no incidences of intra-operative hemorrhage or bile leak were documented, but Group B had two cases of bile leak and four cases of intra-operative cystic artery bleed. Redwan[18] compared harmonic scalpel to clips/cautery in a study involving 160 patients undergoing laparoscopic cholecystectomy. They found that, although the harmonic scalpel is less invasive than the clip/cautery procedure for achieving hemobiliary stasis, it is not more economical than cautery for laparoscopic cholecystectomy.

Hugh *et al*.[19] examined the cystic artery's laparoscopic architecture in their study. The length of the hospital stay and the length of the procedure were comparable across the two groups. There were no instances of bile leak or intra-operative hemorrhage in Group A, whereas there were two instances of bile leak and four instances of intra-operative cystic artery bleeding in Group B. Huscher and colleagues[20] evaluated the use of a ligature with ultrasonic coagulation to divide the cystic artery and duct and found no difference between the two techniques in terms of postoperative mortality and morbidity.

CONCLUSIONS

Results from bipolar electrocautery technique are equivalent to those from the traditional clip technique.

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