

# ULTRASONIC SCALPEL VERSUS CONVENTIONAL ENDOCLIP FOR CLOSURE OF THE CYSTIC DUCT AND ARTERY DURING LAPAROSCOPIC CHOLECYSTECTOMY: A COMPARATIVE RANDOMIZED STUDY

**Samer Saad Bessa , Islam Mohamed Talaat Korayem , KABAMBA KALINDA Adam**

*Department of Surgery, Faculty of Medicine, Alexandria University, Egypt*

## INTRODUCTION

Cholecystolithiasis, refers to the presence of stones in the gallbladder. Several non-invasive methods were developed for removal or destruction of the stones without removing the gallbladder, however cholecystectomy remains the treatment of choice.

Laparoscopic cholecystectomy is the gold standard for the treatment of symptomatic gallbladder stones on the facts that it reduces anesthesia and operative times, reduces blood loss, reduces hospital stay, reduces tissue trauma and adhesion formation, improves the cosmetic aspect, and makes the patient to take less medication and resume earlier their daily activities.

Several techniques have been developed to control and divide the cystic duct and cystic artery. The use of metallic clips to control the cystic duct and artery has substantially facilitated laparoscopic cholecystectomy and is most commonly used method nowadays. Several studies have reported the use of high-power ultrasonic shear to control cystic duct and artery in what became known as “clipless cholecystectomy”.

## Aim of the work

The aim of this prospective randomized study is to assess the safety and feasibility of using a harmonic scalpel for control of the cystic duct and artery compared to conventional clips during laparoscopic cholecystectomy.

## Patients and Methods

The present study included 100 adult patients (age  $\geq 18$  years) presenting with symptomatic uncomplicated gallstone disease who were admitted to the Hepato-pancreato-biliary surgical unit in the Alexandria University Main Hospital from April 2021 to November 2022, The patients were examined, and information from their files was entered into a master table. For all patients, the following were done: **I.** Thorough history taking: ,**II.** Complete physical examination: ,**III.** Laboratory work-up: ,**IV.** Abdominal ultrasonography, **V.** Operative technique: ,**VI.** Intra-operative data: ,**VII.** Post-operative data: **VIII.** Postoperative follow-up: ,**IX.** Statistical analysis of the data

## Results

Intraoperatively, different parameters were examined in the two groups, and we found that: The duration of control and division of the cystic duct was shorter in the harmonic scalpel group compared to the conventional clip as was the time spent in controlling and dividing the cystic artery.

The estimated blood loss in the harmonic scalpel group was minimal compared to that in the conventional clip, with a statistically significant difference.

In the harmonic scalpel group, a smaller number of drains (8 % of patients) were placed compared to the conventional clip (50 % of patients), and the difference was significant ( $p < 0.001$ ). The duration of surgery in the harmonic scalpel group was shorter compared to the conventional clip group

**Table (1): Comparison of the intraoperative data between the two groups**

	Harmonic (n = 50)		Clip (n = 50)		Test of sig.	P
	No.	%	No.	%		
Duration of the operation (min)						
Min. – Max.	36.0 – 120.0		50.0 – 165.0		U = 377.50*	<0.001*
Mean ± SD.	54.22 ± 15.34		81.52 ± 29.37			
Median (IQR)	50.0 (45.0 – 60.0)		70.0 (60.0 – 95.0)			
Time of control and division of cystic duct (sec)						
Min. – Max.	14.0 – 60.0		62.0 – 376.0		U = 0.00*	<0.001*
Mean ± SD.	36.18 ± 12.02		133.28 ± 65.58			
Median (IQR)	35.50 (26.0 – 45.0)		120.0 (86.0 – 150)			
Time of control and division of cystic artery (sec)						
Min. – Max.	1.0 – 57.0		18.0 – 230.0		U = 53.0*	<0.001*
Mean ± SD.	17.56 ± 10.07		80.82 ± 44.34			
Median (IQR)	15.0 (10.0 – 20.0)		66.0 (55.0 – 107.0)			
Bleeding (cc)						
Min. – Max.	0.0 – 20.0		0.0 – 30.0		U= 789.50*	0.001*
Mean ± SD.	2.62 ± 4.78		6.36 ± 7.0			
Median (IQR)	0.0 (0.0 – 5.0)		5.0 (0.0 – 10.0)			
Drain placement	4	8.0	25	50.0	c <sup>2</sup> =21.418*	<0.001*

The postoperative course in both groups was similar, with no significant difference on the visual analogue scale of pain at the second and sixth hours postoperatively, as well as nausea and vomiting.

All patients spent the night in the hospital and were discharged the following day; no need for readmission was noted in either group, and no complications were noted. The patients were followed up in the outpatient clinic one week after surgery with an abdominal-pelvic ultrasound; no biloma was seen and no biliary injury was noted in either group.

**Table (2): Comparison of the postoperative data between the two groups**

	Harmonic (n = 50)		Clip (n = 50)		Test of sig.	P
Visual analogue scale						
At 2 hours postoperative						
Min. – Max.	0.0 – 5.0		0.0 – 6.0		U =1159.0	0.512
Mean ± SD.	3.22 ± 1.11		3.28 ± 1.26			
Median (IQR)	3.0 (3.0 – 4.0)		3.0 (3.0 – 4.0)			
At 6 hours postoperative						
Min. – Max.	0.0 – 3.0		0.0 – 4.0		U=1086.5	0.232
Mean ± SD.	1.02 ± 0.94		0.84 ± 1.02			
Median (IQR)	1.0 (0.0 – 2.0)		0.50 (0.0 – 2.0)			
P <sub>0</sub>	<0.001*		<0.001*			
Postoperative nausea and vomiting	1	2.0	2	4.0	c <sup>2</sup> = 0.344	1.000

## Conclusions

The use of a harmonic scalpel in laparoscopic cholecystectomy to control and divide the cystic duct and cystic artery is as safe as a conventional clip during laparoscopic cholecystectomy for chronic calcular cholecystitis. The use of a harmonic scalpel during laparoscopic cholecystectomy is associated with less time spent controlling and dividing the cystic duct and cystic artery and a shorter overall operating time. However, it is worth mentioning that we should not disregard the cost of the harmonic scalpel compared to the conventional clip, which is in favor of the clip for its lower cost.