

Original Article

Clipless Laparoscopic Cholecystectomy by Ultrasonic

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Background: Ultrasonically activated devices have been used in gallbladder dissection in laparoscopic cholecystectomy with encouraging results. The aim of this study was to compare between the safety and efficacy of the harmonic scalpel and the commonly used clip technique in achieving safe closure and division of the cystic duct in alaparoscopic cholecystectomy.

Methods: In this prospective study, 114 patients with chronically inflamed symptomatic gallstone disease were randomly assigned to either a harmonic scalpel laparoscopic cholecystectomy, group (Group1=58 patients) where closure and division of the cystic duct was achieved solely by a harmonic scalpel or by clip laparoscopic cholecystectomy group (Group2=56 patients).

Results: Neither minor nor major bile leaks were encountered in either group ($p=0.2$). Similarly, no bile-duct injuries were encountered in the present study. The incidence of gallbladder perforation was statistically insignificant ($P=0.972$). The median operative time was shorter in the group 1 than in the group 2, statistically significant (23 vs. 30 minutes, respectively; $P=0.000$). No statistically significant difference was found in the incidence of postoperative complications between the two groups.

Conclusions: The harmonic shears are as safe and effective as the commonly used clip technique in achieving safe closure and division of the cystic duct in a laparoscopic cholecystectomy. Further, it provides a superior alternative to the currently used method in terms of shorter operative.

Key words: clip less, laparoscopic cholecystectomy, harmonic scalpel.

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Introduction

Laparoscopic cholecystectomy is a commonly performed operation for patients diagnosed with gall stones. The technique of laparoscopic cholecystectomy still has areas requiring refinement, including complications of clips being dislodged. The use of the ultrasonically activated scalpel, harmonic scalpel for tissue cutting and coagulation is a potential replacement for electrosurgery, which can be related to different complications. The harmonic scalpel was previously used for the division of the cystic artery and liver-bed dissection. Recent advances in harmonic scalpel technology now provide safe division and closure of the cystic duct up to 6 mm in diameter.¹⁻⁷ So total Harmonic scalpel dissection in the performance of a laparoscopic cholecystectomy was described.⁸ The resulting decrease in temperature, smoke, and lateral tissue damage placed the harmonic scalpel in contrast to the effects seen with the more traditional electrocautery. In addition, the elimination of inadvertent, sometimes unrecognized, electrical arcing

injuries with their potentially hazardous sequelae supported the role of the harmonic scalpel as a potentially safer instrument for tissue dissection.⁶ It tackles the concerns regarding smoke production, and inadvertent injuries to the abdominal organs and structures.⁹ Moreover, it shortens the operative time and decreases the rate of accidental bile spillage.¹⁰ A single working instrument means avoidance of repeated instrument changes during the operation, as selecting different instruments breaks the natural flow of the operation and may distract the surgeon.⁹ This study was undertaken to demonstrate the efficiency, and safety of the Harmonic scalpel as the sole instrument to achieve complete hemo-biliary stasis in the performance of laparoscopic cholecystectomy.

Materials and Methods

Patient population: From July, 2009 to July 2011, a Sample of 144 cases of chronically inflamed symptomatic gall stone disease were included in this

study from Surgical Unit 1, Holy Family Hospital and authors Surgical Clinics.

Clinical and diagnostic work-up: all patients were subjected to:

1. Full history taking.
2. Clinical examination.
3. Investigations which included: Routine lab tests (blood count, random sugar, serum creatinine) Routine chest X-ray, ECG, Liver function tests. Prothrombin time. Abdominal ultrasonography.

Inclusion Criteria: All the patients presenting with Chronic Cholecystitis (Ensuring CBD diameter < 6mm).

Exclusion Criteria: Patients suffering from Acute Cholecystitis and its complications. Patients suffering from CLD.

All patients were randomly assigned for laparoscopic cholecystectomy as follows:

Group 1 (clip-less Harmonic group) included 58 cases; a Harmonic scalpel was used.

Ultrasonic shear (Olympus Keymed Sono surg version G2 220-240 V 3A. 50/60 Hz.) was used as the only working instrument during the procedure through 10 mm epigastric port, for dissection/cutting of cystic artery and duct, then gall bladder dissection from liver bed helped by grasper through right mid clavicular 5 mm port to attain complete hemo-biliary stasis, lastly the gall bladder is retrieved from the epigastric 10 mm trocars site.

Group 2 (clip group) included 56 cases; the conventional instruments were used with the application of clips. One small catheter drain was put in all cases that was removed after 24 hours. All patients were followed up with post operative treatment in the form of broad spectrum antibiotic prophylaxis, and analgesia until they discharged from hospital.

Recording of all patients data were done, and categorized as, intra-operative perforation of the bladder and biliary spillage, intraoperative injuries, or complications, operative time, as well as post-operative complications especially drain output and its nature.

Ethical considerations and informed consent: The study protocol was approved by the local Ethical Committee, and it was explained to each patient and his/her informed consent obtained prior to entry into the study.

Statistical analysis: The results are expressed as the mean $\pm$ SD & number (%). Statistical analysis was performed with the software SPSS Version 12, using student T. test to determine significant numeric data, using Chi Square to determine signs for non- parametric data. P value was determined as significant ($P < 0.05$).

Results

Results are shown in tables

TABLE1. AGE AND DURATION OF THE SURGERY				
Variables	Groups	Mean	SD	P-VALUE (t Test)
AGE OF PTS (YEARS)	Group1 (n=58)	40	10	.107
	Group2 (n=56)	44	12	
DURATION OF SURG. (MINUTE S)	Group1	23	5	.000
	Group2	30	5	

Table 2 CONTENTS AND VOLUME OF DRAIN					
GROUP S	BLO OD	BILE	SER UM	NO OU TP UT	P VAL UE (chi squar e)
Group1	2	1	47	8	.2
Group2	3	5	43	5	
VOLUM E OF DRAIN AT 24 hrs(ml)	Grou p1	Mea n	SD		.1
	Grou p2	11	10		
		15	16		

No conversion to open
No cbd injury

Discussion

TABLE 3 PERFORATION OF GALL BLADDER			
GROUPS	YES	NO	P VALUE(chi square)
Group1	2	56	.972
Group2	2	54	

Ever since Philips Mouret performed the first video-laparoscopic cholecystectomy in Lyons, France,¹¹ this procedure is gaining popularity day by day and has become treatment of choice and is a Gold Standard for symptomatic gallstones¹². The Technique has underwent various modifications since then; the most recent is use of harmonic scalpel to cut cystic artery and cystic duct.

This study clearly demonstrates that the harmonic scalpel provides complete and reliable

hemo-biliary stasis without clinically significant immediate or post operative complications.¹³ It is feasible, easily handled, and very efficient. In fact the properties intrinsic to the harmonic scalpel (cavitations and smokeless coagulation) seem to provide an advantage over electrocautery in the dissection of the gall bladder and may enhance surgeon performance.^{6,10,14} Except for the 2-3 minute interval required for cystic duct division, the use of harmonic scalpel shortens operative time.¹⁵ Our study also showed shorter duration of surgery in group1, which was statistically significant (23 vs. 30 respectively with P value=.000)

The frequency of gall bladder perforation in our study was equal in both groups (2 vs. 2 respectively with P value=.972). Most authors denotes that harmonic clip less cholecystectomy is associated with significantly lower incidence of gall bladder perforation and bile spillage.^{8,14,15} Not a single case of common bile duct injury was encountered in either group though various studies still report common bile duct injury.¹⁶ Similarly in both groups, laparoscopic cholecystectomy procedure conversion to open cholecystectomy, was not indicated in any case though other studies indicate a definite conversion rate.¹⁷ Both of these features may be related to inclusion of only chronically inflamed gall bladders in our study.

No major post operative complications was encountered in either of the two group. Post operative bile drainage was encountered less in group1 than in group2 but it was not statistically significant (5 vs. 8 respectively with P

Value = 0.2, 11ml vs. 15ml respectively with P Value = .1) and this may be attributed to the effectiveness of harmonic scalpel in gall bladder dissection with hemobiliary stasis, with efficient closure of the Duct of Luschka thus preventing post operative bile leakage from the liver bed that may contribute to small bilomas, and the associated morbidity. Same observation was also documented in various studies^{6,14,15,18,19,20}.

Conclusion

The Harmonic scalpel is a safe, efficient, and practical instrument to use during laparoscopic cholecystectomy especially if used as a sole working instrument, with complete hemo biliary stasis. Its application shortens the operative time and decreases accidental bile spillage.

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