

Original Research Article

Harmonic scalpel versus titanium clips and l-hook in the ligation of cystic duct and artery and gall bladder dissection in laparoscopic cholecystectomy

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Received: 28 August 2017

Accepted: 24 October 2017

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ABSTRACT

Background: Laparoscopic cholecystectomy is a gold standard for gall bladder stone surgery. The Aim and objective of study was to compare the total duration of surgery, intraoperative complication like bile leak from cystic duct stump, spillage of bile from gallbladder and post op pain and abdomen distension and jaundice.

Methods: Study was carried out in dept. of gen Surgery, Govt medical college Kota in yr. 2015-16 in a total of 50 patients with cholelithiasis with cholecystitis. Patient were equally divided randomly into two groups (a) Harmonic scalpel group and (b) Titanium Clip and L hook group. All patients with medical comorbidities, Concomitant CBD calculi, cirrhosis and portal HT were excluded from study. Intraoperatively adhesions, bile spillage from GB and cystic duct stump noted Postoperatively complain like pain abdomen, Jaundice, and fever were noted. Duration of hospital stay was observed. All results were statistically analyzed using Chi square and ANOVA test.

Results: Both groups were comparable on the basis of age and sex distribution, as no statistically difference was noted (P value 0.867 and 0.999 respectively). Intraoperative findings were adhesions 5 in clip group and 7 in harmonic group. Spillage from gall bladder was 2 in Clip group and 3 in harmonic group. Mean duration of surgery was 65.20 min in clip group and 63.68 in harmonic group with no statistically significant difference in both the group (P Value 0.727). Average duration of hospital stay was similar in both the groups with a mean of 2.6 days. Postoperative complication was fever, abdomen pain and distension were 3,1,1 were respectively in the clip group and 3,2,2 respectively in harmonic group with the P value of 0.999 which was statistically insignificant. No CBD injury was noted in any case. Conversion to open cholecystectomy was not done in any case. On 1 week and 1 month follow up 2 cases in clip group and 1 in HS group had collection in gall bladder fossa and none at 1 month.

Conclusions: Harmonic scalpel offers an effective, alternative and safe method to cystic duct division and Gallbladder dissection from liver bed.

Keywords: Clips. L hook, Harmonic scalpel, Laparoscopic cholecystectomy

INTRODUCTION

Laparoscopic cholecystectomy is most commonly performed surgery in any surgical O.T. The standard laparoscopic cholecystectomy is usually performed by

using monopolar L hook for gall bladder dissection and titanium metallic clip for occlusion of cystic duct and cystic artery. Some pitfalls associated with the use of monopolar hook is risk of thermal injury and more common post-operative biliary complications such as bile

leakage due to slippage of clips.^{1,2} Some rare complication at long term follow up is clip migration, clip embolism, stone formation.^{3,4} Ultra sonic dissection is safe alternative to electrocautery offering great precision in tight spaces near vital structures with less instrument changes and less tissue scarring and improved visibility of surgical field. However, availability of HS is limited in most surgical centers due to its cost. The aim and objective of the study was to compare the total duration of surgery, intraoperative complication like bile leak from cystic duct stump, spillage of bile from gallbladder and post op pain and abdomen distension and jaundice and collection of fluid in gall bladder fossa at 1 week and 1 month follow up.

METHODS

Study was carried out in dept. of gen Surgery, Govt medical college Kota in yr. 2015-16 in a total of 50 patients with cholelithiasis with cholecystitis. Patient were equally divided randomly into two groups (a) Harmonic scalpel group and (b) Titanium Clip and L hook group. All patients with acute cholecystitis, medical comorbidities, Concomitant CBD calculi, cirrhosis and portal HT were excluded from study. All routine pre-operative investigations were carried out. Pre-anesthetic checkup was done. Laparoscopic cholecystectomy was done under GA. Intraoperatively adhesions, bile spillage from GB and cystic duct stump noted, the total duration of surgery was noted in both the groups. Postoperatively complain like pain abdomen, Jaundice, and fever were noted. Collection at gall bladder fossa was noted at 1 week and 1 month in both groups. Duration of hospital stay was observed. All results were statistically analyzed using Chi square and ANOVA test.

RESULTS

A comparative study on 50 patients of cholelithiasis with chronic cholecystitis with Harmonic scalpel and titanium clips and L hook was carried out. Following were the results.

Table 1: Comparison of patients with respect to age (years).

Group	No of patients	Age (years)		P-value
		Mean	SD	
Clip group	25	36.88	11.81	0.867
Harmonic group	25	37.44	11.66	

Both groups were compatible on the basis of Age distribution as no statistically significant difference was present (P value 0.867).

The incidence of gall bladder disease was higher in the females as compared to males in both the groups. Both groups were compatible on the basis of sex distribution as

no statistically significant difference was present (P value 0.999 0).

Table 2: Comparison of gender wise distribution of patients.

Gender	Group		Total	P-value
	Clip group	Harmonic group		
Male	5	6	11	0.999
Female	20	19	39	
Total	25	25	50	

Table 3: Intra-op findings.

	Group		P value
	Clip group	Harmonic group	
Cystic duct leakage	03	02	0.972
Gall bladder perforation	03	02	
Adhesions	05	07	
CBD injury	00	00	

Adhesions was the most common intra op finding in both groups followed by gall bladder perforation. Not a single incidence of CBD injury was seen in both groups. There was no statistically significant difference in the intra operative findings in both the groups.

Table 4: Distribution of patients with respect to time duration for surgery.

Group	Number of patients	Duration of surgery		P value
		Mean	SD	
Clip group	25	65.20	15.51	0.727
Harmonic group	25	63.68	15.11	

Table 4 shows mean duration of surgery was 65.20 min. in clip group and 63.8 min. in harmonic group. There was no statistical difference in time duration for surgery among both the groups (P value 0.727).

Table 5: Distribution of patients with respect of hospital stay.

Group	Number of patients	Hospital stay (days)		P-value
		Mean	SD	
Clip group	25	2.64	0.76	0.999
Harmonic group	25	2.64	0.76	

The average duration of stay was similar in the clip as well as the harmonic group with a p value of 0.999 which is statistically insignificant.

Table 6: Distribution of patients with respect to post-operative complications.

Post-operative complications	Group		P-value
	Clip group (n=25)	Harmonic group (n=25)	
Fever	3	3	0.999
Abdominal pain	1	2	0.999
Abdominal distension	1	2	0.999

Table 6 Fever was the most common complication in both the groups. However, the table shows that there was no statistical difference in the post op complications in both groups.

Table 7: Distribution of patients with respect to collection in Gall bladder fossa in follow up.

Collection on USG	Group	
	Clip group	Harmonic group
At 1 week	02	01
At 1 month	00	00

There was similar incidence of collection in both groups on follow up done by USG of gall bladder fossa at 1 and 4 weeks respectively.

DISCUSSION

Laparoscopic cholecystectomy is the treatment of choice for cholelithiasis. Closure of cystic duct with titanium clips is the most commonly used method. Unfortunately literature provides various examples of cystic duct leakage due to inadequate closure of duct, due to mismatch of clip arms, necrosis of duct at the site of clipping or slippage of clips or internalization of clips causing stone and embolism of clips.^{2,3} Metal clips can fall from the applicator, artefacts in CT scans and MRI.⁵ In recent years use of ultrasonic cavitation devices like harmonic scalpel is feasible, easy to handle, provide smokeless coagulation provides an advantage over electrocautery in the dissection of the gall bladder.

In our study mean age was 37.16 with 78% females and 22% males which was comparable to Jahangir Khans et al study where in the mean age was 40 years, with 71% females and 29% males.⁶ Gall bladder perforation frequency in our study was compatible in both the groups 2 in harmonic group and 3 in clip group. Studies by Westervelt, Bessa showed that clipless cholecystectomy is associated with a significantly lower incidence of gall bladder perforation and bile spillage.^{7,8}

Not a single bile duct injury was encountered in our study. Fathy et al study reported 0.35% cases of CBD injury.⁹ Marakis et al study showed a 4.8% conversion to open surgery.¹⁰ The different result in our study may be

related to inclusion of only chronically inflamed gall bladder. Except for the 2-3-minute interval required for cystic duct ligation with clip application, duration of surgery was statistically insignificant in both the groups with a mean duration of 65.20 ± 15.51 minutes in clip group and 63.58 ± 15.11 minutes (p value 0.727) in the harmonic group. Similarly, in study by Yilmaz et al no significant difference was seen in both groups in time though the time was less in the HS group.

In our study no, major postoperative complications were encountered in both the groups. Post-operative collection was found less in HS group, but it was not statistically significant with a p value of 0.2.

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 biliomas and associated morbidity. Same observation was documented in Tsimoyiannis et al, huscher et al, Nazih Salameh et al.¹¹⁻¹³

CONCLUSION

This study demonstrates that the use harmonic scalpel for the closure of cystic duct is as effective as conventional clip application. Harmonic scalpel is a newer innovative device being used for dissection and haemostasis in laparoscopic cholecystectomy. The device is handy, easy to use, safe and reliable. We experienced no technical difficulty with its use. There was no statistically significant difference in both the groups with the respect to intra-operative and post-operative complication. However, the sample size and follow-up period in the current study is relatively short, a larger study sample and longer follow-up may be needed before any conclusion can be made. Moreover, the cost of HS makes its availability less in many surgical centres. On the basis of this study we recommend a wider use of harmonic scalpel for closure of cystic duct, when laparoscopic cholecystectomy is being performed by using harmonic scalpel.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Vijayvargiya A, Jain SK, Soni V. Harmonic scalpel versus titanium clips and I-hook in the ligation of cystic duct and artery and gall bladder dissection in laparoscopic cholecystectomy. *Int J Res Med Sci* 2017;5:5145-8.