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Original Research Article

Is suture ligation of cystic duct in laparoscopic cholecystectomy a safe alternative to clipping? Our experience in a rural centre

K. R. Manoj Prabu, Dhinesh Balaji, Vishwanath M. Pai*

Department of General Surgery, Saveetha Medical College, Kanchipuram, Tamil Nadu, India

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***Correspondence:**
Dr. Vishwanath M. Pai,
E-mail: vishwanathpai@hotmail.com

ABSTRACT

Background: Laparoscopic cholecystectomy is one of the most common surgeries performed nowadays. It remains an enigma regarding efficacy, safety and postoperative complications for using suture ligation for ligating cystic duct in laparoscopic cholecystectomy. The aim of the present study was to study the efficacy of ligating the cystic duct with sutures in laparoscopic cholecystectomy.
Methods: This prospective study was performed between June 2018 and April 2019 in Saveetha Medical College and Hospital, in a rural center, Kanchipuram, India. All the patients included consented for the study. Patients who underwent subtotal cholecystectomy were excluded from the study.
Results: The study included 70 patients who underwent laparoscopic cholecystectomy in a single unit. All cases were operated by a single surgeon. Of the 70 patients, the cystic duct (CD) was simply ligated in 55 patients with CD <5 mm in diameter. The CD in 15 of those patients had to be divided and sutured in continuity for wide CD (>5 mm). The mean time for ligation of cystic duct was 5 min. Similarly, the mean time for ligation of cystic artery was 1.50 min. The mean operative time was 50 mins. There were no postoperative complications, such as bile leakage.
Conclusions: SL of the CD is a very safe and secure alternative to the application of metal clips. It can be used in dilated CD, readily available and very cost effective and the complications of clips are avoided. The only disadvantage is that it needs expertise to perform and subsequently increasing the operating time. This technique is recommended in all laparoscopic cholecystectomies, especially in difficult cases.

Keywords: Cystic duct, Suture ligation, Laparoscopic cholecystectomy

INTRODUCTION

Cholecystectomy is the second most commonly performed intra-abdominal operation worldwide after appendicectomy. It has enjoyed largely an unchallenged supremacy as the treatment of choice in cholelithiasis since it was performed by Carl Langenbuch in 1882. Laparoscopic cholecystectomy (LC) has been performed for decades and is a fairly standardized procedure throughout the world. Ligation of the cystic duct (CD) is popularly done with the help of metal clips (MC).[1-4]

There are many other techniques described in the literature to deal with ligation of the CD. Suture ligation (SL) of the duct is one such way. The technique is simple, secure and cost-effective. Some studies compared the harmonic scalpel and clip to close the cystic duct and cystic artery in a single incision Laparoscopic cholecystectomy (LC). Harmonic scalpel has been recently used for ligating cystic pedicle which is feasible, safe and effective performing LC although cost is a constraint.[5]

Aim

The aim of the present study was to study the efficacy and safety of suture ligation of the cystic duct in laparoscopic cholecystectomy.

METHODS

This prospective study was performed between June 2018 and April 2019 in Saveetha Medical College and Hospital. All patients who underwent LC were included in this study. Patients who underwent subtotal cholecystectomy were excluded. The same principle of Calot's triangle dissection was followed for all patients. Drain was placed in the sub hepatic area in all patients and was removed when the volume decreased to <20 mL/24 hours. All patients underwent routine ultrasound, to look for peri-cystic duct collection on post-operative day (POD) 6. Patients were followed up in the immediate postoperative period for complications and subsequently for long-term follow-up.

RESULTS

A total of 70 patients were included in the study. 67% of the patients were female and 33% were male. It was found that the disease was most common in the third decade of life and was predominantly in females. 80% of the patients presented with right upper quadrant abdominal pain. In 55 patients CD was simply ligated. In 15 patients CD was divided and sutured in continuity due to wide (>5 mm) CD. The mean operating time was 50 mins. The mean time for ligation of cystic duct was 5 min. Similarly, the mean time for ligation of cystic artery was 1.50 min. The drain volume was 20 ml and 10 ml serous in POD 1 and 2 respectively and was removed on POD 2. There was very minimal peri-cystic duct collection on ultrasound in POD 6 and no intervention was required. The hospital stay was 2 to 3 days. There were no post-operative complications. All patients were followed up for a period of 3 months. No significant long-term morbidity was noted.

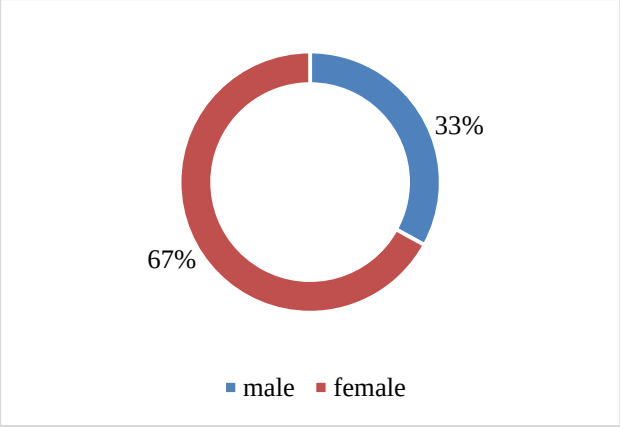

Figure 1: Sex distribution.

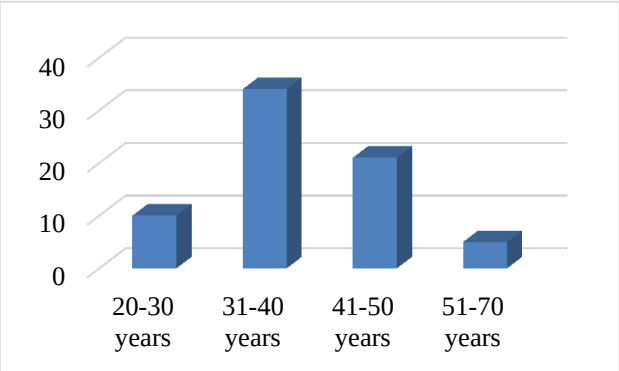

Figure 2: Age distribution.

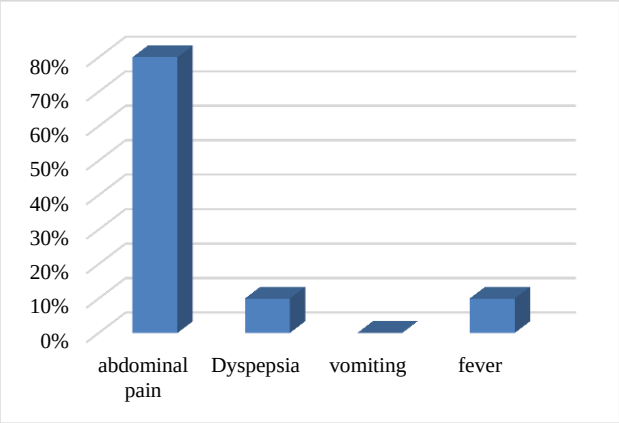

Figure 3: Presenting complaints.

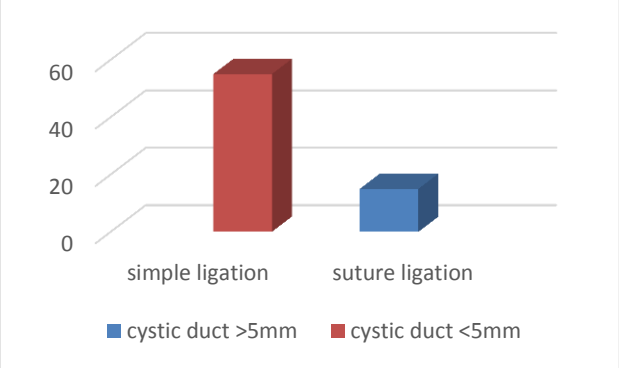

Figure 4: Intra-op finding.

DISCUSSION

LC has been the gold standard for over two decades.[6] The complexity of gallbladder pathologies and its varied clinical presentation all has a bearing to what is in store for the operating surgeon. Be it a resident trainee or an expert surgeon, gallbladder surgeries always have a special reverence among all. Having been done extensively over the years, this surgery is one of the most standardized procedures today. The principle of

gallbladder surgeries has been clearly defined and the techniques adapted today, all pave way for the safest possible outcome for the patient.[7,8]

In this study, we put to use the older straightforward technique of SL of the CD and see its efficacy, safety and complications. In our series, the longest time duration was at 3 h 12 min. In a retrospective study by Subhas et al, out of 3126 patients studied, 70 patients were identified to have an operating time of more than 3 h, the operating time ranged between 3 h and 6 h 40 min for difficult surgeries.[1]

Golash et al stated that the method of total intra-corporeal cystic duct and artery ligation in LC is simple, technically easy, secure, and economical. The authors did closure of the CD with an absorbable polyglactin suture by 'C' technique intra-corporeal knotting in 1000 patients.[10] Gurusamy found that it was necessary to close the cystic duct completely during LC to avoid leak from stump. There was a statistically significant longer operating time (mean difference 12.00 minutes) in the ligature group than in the non-absorbable clips group.[8] In our study the mean operating time was 50 mins and CD closure done by simple ligation for CD <5 mm and divide and continuous suture for CD >5 mm.

In our study the mean time for CD ligation is 5 min. The CD was ligated with simple ligation where the CD was <5 mm in diameter (78.6%). We encountered a wide CD in 15 patients (21.4%) in whom we divided the CD and suture ligated. Intracorporeal ligation is normally superior to extra corporeal knotting. Single ligation of artery and duct is safe and economical.[11] Even though Geidie used monopolar cautery to tackle the cystic artery with no documents in thermal injury to CBD, we prefer the use of the safer option of ligating the cystic artery.[4]

Post-operative bile leak is a serious complication following LC. While majority of surgeons prefer the use of MC in routine LC, the disadvantage is that the clip limbs may not approximate correctly or the clips might slip off the stump.[9] Compared to MC, it is observed that the use of absorbable locking clips shows a lesser incidence in bile leak post-operatively.[2]

Mehmedovic et al declared that LC was associated with a higher risk of intraoperative lesions and primarily lesions of biliary ducts. In a small percentage of cases, biliary fistulas occur, most commonly after leakage from cystic duct stump or accessory bile ducts.[12] Our study observed that with the tight secure of polyglactin to the cystic duct, the colour of the duct changed to white. We have not come across any kind of injury in any patients.

In our study, the cost of polyglactin suture was much cheaper than that of titanium clips used for the cystic duct and artery. For the suture material used during the study, the price was only 250-300 rupees (3.51-4.21 $), whereas for the titanium clips used for clipping it was far higher, reaching 790-1000 rupees (12.28-15.55 $). This suggests that the use of suture for ligation is a very cost-effective and economic option for ligation.

The use of simple ligature for CD occlusion is a very safe technique to prevent post-operative bile leak.[13] For beginners, it might be time-consuming to do an intra-corporeal knot but in the long run, it helps to harness knowing skills very early. Furthermore, intra-corporeal knowing and suturing are very important in the practice of advanced laparoscopic procedures. In conditions where the CD is dilated and wide, the clip may not occlude the entire lumen and thus the risk of leak is high. The same when suture ligated is safe and secure.

CONCLUSION

SL of the CD is a very safe and secure alternative to the application of MC. It can be used in dilated CD, readily available and very cost effective and the complications of clips are avoided. The only disadvantage is that it needs expertise to perform and subsequently increasing the operating time. This technique is recommended in all laparoscopic cholecystectomies, especially in difficult cases.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Subhas G, Gupta A, Bhullar J, Dubay L, Ferguson L, Goriel Y, et al. Prolonged (longer than 3 hours) laparoscopic cholecystectomy: reasons and results. Am Surg. 2011;77:981-4.
2. Rohatgi A, Widdison AL. An audit of cystic duct closure in laparoscopic cholecystectomies. Surg Endosc. 2006;20:875-7.
3. Seenu V, Shridhar D, Bal C, Parshad R, Kumar A. Laparascopic cholecystectomy: cystic duct occlusion with titanium clips or ligature? A prospective randomized study. Trop Gastroenterol. 2004;25:180-3.
4. ElGeidie AA. New technique of clipless laparoscopic cholecystectomy. Surg Sci. 2012;3:310-3.
5. Huseyin Y, Husnu A, Ilhan E, Akın C, Mustafa S. Closure of the cystic duct: comparison to harmonic scalpel versus clip application in single incision laparoscopic cholecystectomy. J Gastroint Dig Syst. 2014;4:165.
6. Barkun JS, Barkun AN, Sampalis JS, Fried G, Taylor B, Wexler MJ, et al. Randomised controlled trial of laparoscopic versus mini cholecystectomy. The McGill gallstone treatment group. Lancet. 1992;340:1116-9.
7. Yoshizumi T, Ikeda T, Shimizu T, Ohta S, Nagata S, Sonoda T, et al. Clip migration causes

choledocholithiasis after laparoscopic cholecystectomy. Surg Endosc. 2000;14:1188.
8. Gurusamy KS, Bong JJ, Fusai G, Davidson BR. Methods of cystic duct occlusion during laparoscopic cholecystectomy. Cochrane Database Syst Rev. 2010;10:CD006807.
9. McMahon AJ, Fullarton G, Baxter JN, O'Dwyer PJ. Bile duct injury and bile leakage in laparoscopic cholecystectomy. Br J Surg. 1995;82:307-13.
10. Golash V. An experience with 1000 consecutive cystic duct ligation in laparoscopic cholecystectomy. Surg Laparosc Endosc Percutan Tech. 2008;18:155-6.
11. Shah JN, Maharjan SB. Clipless laparoscopic cholecystectomy- a prospective observational study. Nepal Med Coll J. 2010;12:69-71.
12. Mehmedovic Z, Mehmedovic M, Hasanovic J. A rare case of biliary leakage after laparoscopic cholecystectomy-diagnostic evaluation and nonsurgical treatment: a case report. Acta Inform Med. 2015;2:116-9.
13. Saha SK. Ligating the cystic duct in laparoscopic cholecystectomy. Am J Surg. 2000;179:494-6.
14. Rawal KK. Migration of surgical clips into the common bile duct after laparoscopic cholecystectomy. Case Rep Gastroenterol. 2017;3:787-92.
15. Nagorni EA, Kouklakis G, Tsaroucha A, Foutzitzi S, Courcoutsakis N, Romanidis K, et al. Post-laparoscopic cholecystectomy Mirizzi syndrome induced by polymeric surgical clips: a case report and review of the literature. J Med Case Rep. 2016;10:135.
16. Singal R, Sharma A, Zaman M. The safety and efficacy of clipless versus conventional laparoscopic cholecystectomy- our experience in an Indian rural center. Maedica (Buchar). 2018;13(1):44-50.

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