Feasibility of Minilaparoscopic Cholecystectomy. A pilot Study

Yasser Fawzy Zidan, Sahir Mahir Al-Azawii, Muthanna Asaad Al-Sharbaty

ABSTRACT:

BACKGROUND:

Cholecystectomy is the defacto standard operation for cholelithiasis and there are continuous attempts to do it through a less invasive incision known as mini laparoscopic cholecystectomy (MLC).

OBJECTIVE:

The purpose of this study is to evaluate the safety and feasibility of MLC in our center.

PATIENTS AND METHODS:

This is a pilot study involving 6 selected patients for whom MLC was performed at Al-Jamhory teaching hospital after acquiring the ethical committee permission and patients' informed consent.

RESULTS:

The study includes six patients, their average age is 27 years and their average BMI is 28kg\m^2. The average operative time is 53 minutes without intra-operative complications. The post-operative pain is mild and the hospital stay is about 12 hours. All patients were satisfied with the cosmetic results.

CONCLUSION:

This study shows that MLC a safe and feasible procedure; it takes more time than LC but has mild post-operative pain and excellent cosmetic results. It can also be done as a day case surgery.

KEYWORDS: Mini laparoscopic cholecystectomy, scar less cholecystectomy

INTRODUCTION:

The use of laparoscopy in surgery is the greatest revolution in the last few decades and from that time on, this field continued to evolve [1]. Laparoscopic surgery deserves its great reputation as it minimizes the invasion without compromising vision. It's worth mentioning that the first laparoscopic cholecystectomy (LC) was performed by Prof Mu¨he in Germany in 1985 and progressed in 1988 in USA and France to become the gold standard for treating gall stones [2,3]. Research shows that LC has lower mortality and complications as compared to open cholecystectomy with shorter hospital stay and better cosmetic results [4.5].

Theodor Kocher stated more than 100 years ago that: "The incision must be as long as necessary and as short as possible". Many methods have evolved in laparoscopic field to get less invasion which was reflected on pain, scars and hospital stay, among these techniques (NOTES, SILS and mini laparoscopy) [6,7], so recently surgeons try to improve the technique of LC by decreasing invasiveness through reducing numbers and, size of the operating ports and instruments, but these trials are not well established yet [8,9]. Finally the mini laparoscopic cholecystectomy MLC can be defined as performing surgery through smaller diameter instruments (smaller than traditional laparoscopic cholecystectomy i.e.. less than the 5-mm instruments)[10].

Blinman postulated a theory to measure the amount of tissue damage in different trocar sizes and according to that we expect the that mini LC (MLC) has half tissue trauma than traditional LC (TLC) [11].

Al-Jumhoori Teaching Hospital, Mosul, Nineveh\ Iraq

PATIENTS AND METHODS:

This pilot study was conducted at Al-Jamhory Teaching Hospital in Mosul during February - April 2019 and it involved 6 patients (5 females and 1 male) with symptomatic gall stones. Their age was 19-33 years (average 27 years) and their BMI was 23-33 kg\m^2 (average 28 kg\m^2). Those patients were carefully selected, while patients with recurrent attacks of cholecystitis, obese or thick wall were excluded from the study.

Routine investigations were performed according to the international guidelines and ultrasound results show normal gall bladder wall thickness without evidence of cholecystitis. The operations were performed under general anesthesia by the same surgical team using 1 (10 mm) invisible trans umbilical port and 3 (3mm) ports with 2.7 mm instrument from Karl Storz ^{R}. These ports were positioned similar to that in traditional laparoscopic cholecystectomy TLC in the first two cases, then repositioned a little higher to avoid damage to instruments.

Pneumoperitoneum was performed by verse needle and after intra-abdominal assessment the procedure started by opening a nip in the peritoneum near the infundibulum of gall bladder and Calot's triangle. Dissection was done by hook and Maryland, and the critical view of safety CVS identified in all cases to assure safety ;the cystic artery was identified and controlled by monopolar cautery proximally and distally before division while the cystic duct was identified and ligated by intra corporeal knots 2/0 silk before division, the gall bladder was removed from its bed using monopolar cautery and extracted from the umbilical port (during extraction, a 3 mm telescope was used in the lateral port so the gall bladder was removed under direct vision). The 3mm port was not sutured and the umbilical wound was sutured by subcutaneous vicryl as shown in figure (1) and (2).

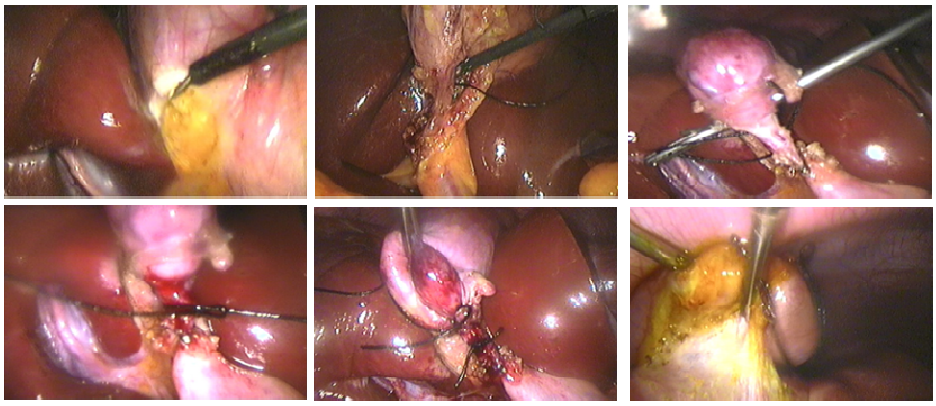


Figure (1:) steps of mini laparoscopic cholecystectomy.

Figure(2):Cosmetic appearance of minilaparoscopic cholecystectomy.

Post-operative analgesia was given in the form of paracetamol 1gm vial and pain assessment was performed using visual analogue scale (VAS).

The videos of all surgical procedures were recorded in addition to operative time, intra and post-operative complications in addition to hospital stay and cosmetic results. Permission from the Ethical committee in Ninwa health sector was obtained and informed consent from patients was obtained after a full discussion of the procedures and available options. Post-operative assessment was performed and the patients were followed up for 2 months.

RESULTS:

Six patients (five females and 1 male), their age is 19-33 years (average27 years) and their body mass index BMI is 23-33 kg\m^2 (average 28kg\m^2). The operative time is 34-69 minutes (average 53 minutes). No intra-operative complications were recorded; The post-operative pain according to VAS was 2-7 (average 4) and the hospital stay was 6-23 hours (average 12 hours) as shown in figures (3-8). All patients were satisfied with cosmetic results.

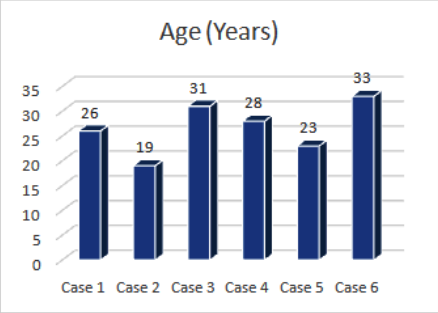


Figure (3):Age in years of the cases.

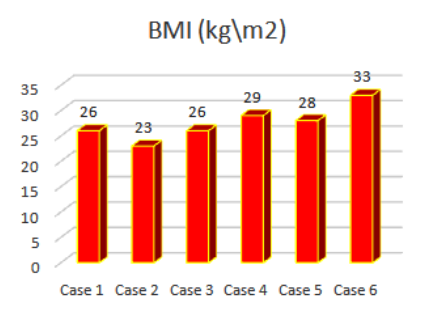


Figure (4): Body mass index of the cases.

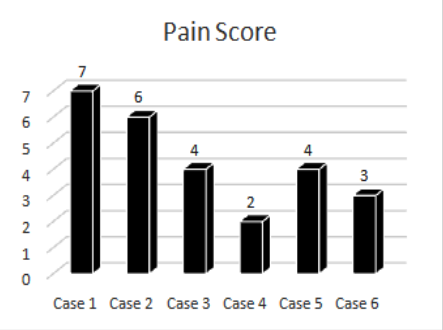
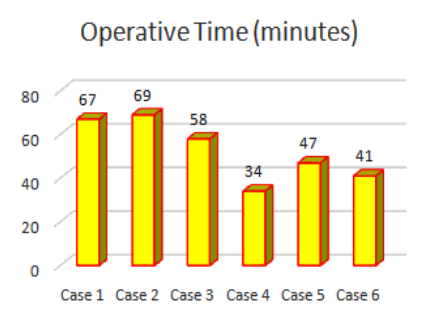


Figure (5):Pain according to VAS of the cases.



Figure(6): Operative time in minutes of the cases.

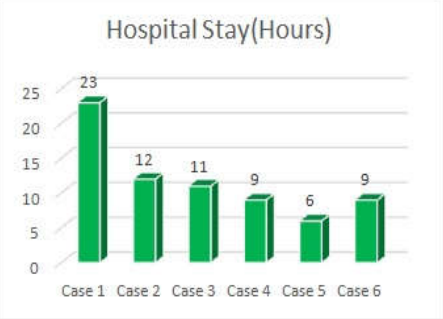
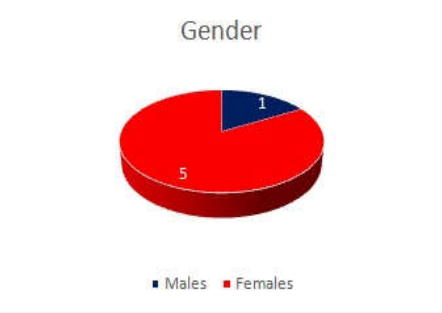


Figure (7): Hospital stay in hours of the cases.



Figure(8): Gender distribution of the cases.

DISCUSSION:

This study was performed to evaluate the safety and feasibility of MLC in Iraq and although the sample was small, this is a pilot study and the initial step for further studies. The selected sample was expected to have easy surgery as the expected risk factors of difficulty were excluded and this can be regarded as a bias.

The average operative time is 53 minutes which is less than the average time mentioned by Yuan in Taiwan which was 79 minutes with longer hospital stay 1.57 days. Both studies agree that the procedures were scar-free with excellent cosmetic results [12]. The operative time in this study was longer than that of Haris et al from Pakistan and Lee et al who mention a 38 minutes operative time. Also, Konstantinos Sapalidis recorded an average of 35 minutes [13] and this can be explained by our early learning curve [14,15]. Sarli recorded an average of 45 minutes [16].

Regarding pain, mild to moderate pain was recorded depending on VAS and incision size is one variable while other variables include age and the pressure of pneumoperitoneum [17,18]. It is therefore difficult to analyze the cause of pain and whether it is related to the length of the incision.

Many randomized controlled trials (RCT) were performed to compare between MLC and TLC and they were comparable with this study in regards to the outcomes parameter of MLC. Deniz et al had an operative time of 47 minutes [19] and the meta-analysis performed by Sajid et al assessed the clinical trials on MLC versus TLC. Only six RCT consisting of 317 patients were eligible. They observed that MLC was associated with longer operative times compared to TLC. The complication rate and length of hospital stay was not statistically different. MLC was found to be better regarding postoperative pain and cosmetic outcomes which was similar to our results [20].

We have to mention that the principles of cholecystectomy were followed and the critical view of safety identified in all cases but the cystic ducts for those patients were controlled by ligature instead of clips and this may be beneficial to minimize injury by cautery [21,22].

Finally we have to mention that there are no intra operative complications ,but the operative time is longer than usual and no serious post operative complication were recorded apart from pain, these results are comparable with the systemic review of Gurusamy et al [23] and Carvalho [24] ,but there are controversy about definite benefit of MLC over the TLC ;while in meta analysis the benefit is not established [25] Chowdhury mentioned that the procedure may be the gold standard in more than 7000 patients [26].

CONCLUSION:

This pilot study shows that MLC is a safe and feasible procedure and that although it has a longer operative time, it can be reduced with practice as it follows a learning curve. MLC shows mild to moderate post-operative pain with excellent cosmetic results and it can be performed as a day case surgery. More case series are required and randomized controlled trials are mandatory to compare between MLC and TLC.

REFERENCES:

1. Christopher E., Larry C.; Lessons Learned from the Evolution of the Laparoscopic Revolution.Surg Clin N Am 88 (2008) 927–941
2. Reynolds JrW. The first laparoscopic cholecystectomy. JSLS 2001 Jan–Mar; 5(1):89–94
3. A prospective analysis of 1518 laparoscopic cholecystectomies. The Southern Surgeons Club. N Engl J Med 1991;324:1073-8.
4. Litwin DE, Girotti MJ, Poulin EC, Mamazza J, Nagy AG. Laparoscopic cholecystectomy: Trans-Canada experience with 2201 cases. Can J Surg 1992;35:291-6
5. Berggren U, Gordh T, Grama D, Haglund U, Rastad J, Arvidsson D. Laparoscopic versus open cholecystectomy: Hospitalization, sick leave, analgesia and trauma responses. Br J Surg 1994;81: 1362-1365.
6. Moshe Schein .Paul N. Rogers (Editors).Schein's Common Sense Emergency Abdominal Surgery .Second Edition. Chapter 10 page83.

7. Gupta A, Shrivastava UK, Kumar P, Burman D. Minilaparoscopic versus laparoscopic cholecystectomy: A randomized controlled trial. Trop Gastroenterol 2005;26:149-51.
8. Unger SWParamo JCPerez M Microlaparoscopic cholecystectomy: less invasive gallbladder surgery. Surg Endosc 2000;14336- 339PubMedGoogle ScholarCrossref
9. Reardon PRKamelgard JIApplebaum BRossman LBrunicardi FC Feasibility of laparoscopic cholecystectomy with miniaturized instrumentation in 50 consecutive cases. World J Surg 1999;23128- 132PubMedGoogle ScholarCrossref
10. World J Gastrointest Surg. 2015 Oct 27; 7(10): 243–248. New minimally invasive approaches for cholecystectomy: Review of literature
11. Blinman T. Incisions do not simply Sum. Surg Endosc2010;24:1746-1751.
12. Yuan RH1, Lee WJ, Yu SC.Mini-laparoscopic cholecystectomy: a cosmetically better, almost scarless procedure. J Laparoendosc Adv Surg Tech A. 1997 Aug;7(4):205-11.
13. Sapalidis K. Mini-laparoscopic cholecystectomy with the MiniLap percutaneous surgical system: a series of 32 patients. International Journal of General Medicine 2018:11 369–371
14. Haris R Shaikh, Asad Abbas, Salik Aleem, Miqdad R Lakhani. Is mini-laparoscopic cholecystectomy any better than the gold standard?: A comparative study.2017;1:42-46.
15. Lee PC, Lai IR, Yu SC. Minilaproscopic (needlescopic) cholecystectomy: A study of 1,011 cases. Surg Endosc 2004;18:1480-4.
16. Sarli L, Iusco D, Gobbi S, Porrini C, Ferro M, Roncoroni L. Randomized clinical trial of laparoscopic cholecystectomy performed with mini-instruments. Br J Surg 2003;90:1345-8
17. Bisgaard T, Klarskov B, Rosenberg J, Kehlet H. Characteristics and prediction of early pain after laparoscopic cholecystectomy. Pain 2001;90:261-9.
18. Gurusamy KS, Samraj K, Davidson BR. Low pressure versus standard pressure pneumoperitoneum in laparoscopic cholecystectomy. Cochrane Database Syst Rev 2009;CD006930.
19. Deniz Atasoy, Afag Aghayeva, Volkan Özben, et al. Mini-laparoscopic versus traditional laparoscopic cholecystectomy: A preliminary study. Laparosc Endosc Surg Sci 2017;24(4):117-121
20. Sajid MS, Khan MA, Ray K, Cheek E, Baig MK. Needlescopic versus laparoscopic cholecystectomy: a meta-analysis. ANZ J Surg 2009;79:437–42.
21. Chong VH.,Yim HB.,Lim cc..Clip induced biliary stone. Singapore Med J 2004;45:533-535.
22. Wasserberg N.,Gal E.,Facu Z.et al.Surgical clip found in duodenal ulcer after laparoscopic cholecystectomy. Surg Laparos Endosc Percutan Tech 2003;13:387-388.
23. Gurusamy KS1, Vaughan J, Ramamoorthy R, Fusai G, Davidson BR. Miniports versus standard ports for laparoscopic cholecystectomy. Cochrane Database Syst Rev. 2013 Aug
24. Carvalho GL1, Paquentin EM2, Redan JA3, Shadduck PP. The Science Behind Mini-Laparoscopic holecystectomy.Surg Technol Int. 2016 Oct 26;29:93-98.
25. Thakur V1, Schlachta CM, Jayaraman S. Minilaparoscopic versus conventional laparoscopic cholecystectomy a systematic review and meta-analysis.Ann Surg. 2011 Feb;253(2):244-58.
26. Chowdhury HK1. Mini-Laparoscopic Cholecystectomy: Review of 7200 Cases. Could it be the New Gold Standard? .Mymensingh Med J. 2016 Apr;25(2): 284-8.