Single-Incision versus Conventional Multiple-Incision Laparoscopic Cholecystectomy at Hat Yai Hospital

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Objective: *To compare single-incision laparoscopic cholecystectomy (SILC) with conventional multiple-incision laparoscopic cholecystectomy (CMILC)*

Material and Method*: The data were retrospectively collected for patients undergoing SILC, and CMILC at Hat Yai Hospital between September 2009 and October 2011. The operative time, hospital stay, postoperative pain, number of narcotic doses, conversion to open surgery, and postoperative complication were analyzed.*

Results: *Of SILC/CMILC groups, 107/108 subjects, the mean operative time was 81.1/74.4 minutes, and SILC was statistically longer ($p < 0.001$). Among SILC/CMILC group, 9/0 cases required the extra ports, as well as 2/5 cases of conversion to open surgery. The mean length of stay of SILC/CMILC was statistically longer of 4.6/3.7 days ($p = 0.04$), in contrast with the mean postoperative pain at 8 hours was statistically lower of 3.4/4.2 ($p = 0.03$). Both groups, the postoperative complication had similar proportion.*

Conclusion: *Preliminary results of the present study showed SILC to be safe compared with CMILC, although operative times were longer.*

Keywords*: Single-incision laparoscopic cholecystectomy, Conventional Multiple-incision Laparoscopic Cholecystectomy*

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The field of laparoscopic surgery has been evolving continuously since the first laparoscopic cholecystectomy (LC) in 1985[1], and now LC is accepted as a gold standard for cholecystectomy[2,3]. Conventional laparoscopic cholecystectomy commonly performed as a four-port technique[4]. Many surgeons have made efforts here to minimize the number and size of ports in incisions in LC in order to decrease parietal trauma and improve cosmetic results[2]. These include single-incision laparoscopic surgeries. Single-incision laparoscopic cholecystectomy (SILC) has been reported since 1997 by Navarra et al, with the removal of a gallbladder through a single periumbilical skin incision[5]. The development of various ports that can pass multiple instruments through umbilicus has made single-port laparoscopic surgery feasible[6]. At Hat Yai Hospital, the first laparoscopic cholecystectomy was performed in July 1992 and in September 2009 the first SILC was performed. The present study was undertaken to compare the short-term results of SILC compared with conventional multiple-incision laparoscopic cholecystectomy (CMILC) at a study hospital.

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Material and Method

After approval of the institutional Ethics Committee, the authors carried out a retrospective analysis of patients with gallbladder diseases who underwent laparoscopic cholecystectomy at Hat Yai Hospital. Between September 2009 and October 2011, the data were collected among patients undergoing single-incision laparoscopic cholecystectomy (SILS), and Conventional Multiple-incision Laparoscopic Cholecystectomy (CMILC), usually 3 to 4 ports. The data include age, BMI, previous surgery, surgical indication, operative time, length of stay, pain score, narcotic use, conversion to open cholecystectomy, and postoperative complication.

The patient had been performed laparoscopic cholescytectomy under general anesthesia. The SILS™ port (Covidien, Inc.), a 0 degree and 10-mm laparoscope (Olympus, Japan) were inserted. Subcostally, the needle of a 3-0 monofilament suture on a straight needle (Maxon 3-0, Ethicon, Inc.) was grasped intracorpirally and placed through the fundus of the gallbladder, and suspended the gallbladder. The pull and rotate technique was used to facilitate exposure

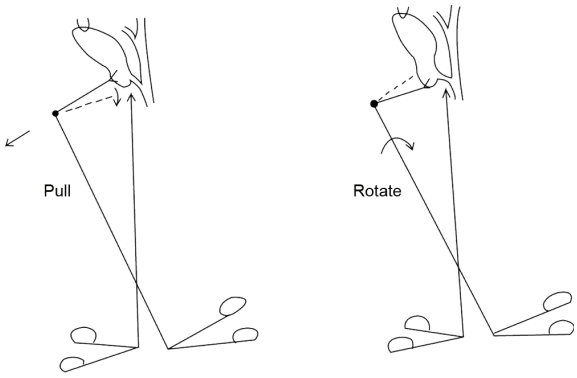

Fig. 1 Pull and rotate technique to expose the Calot's triangle

of the Calot's triangle (Fig. 1). The dissection of the cystic duct was utilized by Autosonix™ (Covidien), the ultrasonic coagulation device, then free with 5-mm clip (Endo Clip; Covidien) and divided, as well as cutting and sealing the cystic artery. The gallbladder was free, grasped with a grasper, and withdrawn respectively.

All of SILC was solely conducted by the author (AK), and the other surgeons performed the CMILC.

Data were analyzed with SPSS for Windows software version 15.0. Univariate comparison of categorical factors was performed using Fishers' exact test. Comparison of quantitative factors was performed using t test. A two-tailed p-value < 0.05 was considered statistically significant.

Results

SILC was attempted in 107 patients (84 women and 23 men), and CMILC was performed in 108 patients (82 women and 26 men), without significant difference in sex ratio. The SILC/CMILC groups had the mean age of 51.3/50.5 ± SD of 15.1/15.3 years, body mass index (BMI) of 24.6/24.1 kg/m^2, and previous abdominal surgery 5/6 cases, without statistical significance. The indication of SILC/CMILC groups were symptomatic gallstone 72 (67.3%)/88 (81.5%) subjects (p = 0.02), acute cholecystitis 20 (18.7%)/7 (6.5%) (p < 0.01), and the remainder were other indications.

In Table 1, the SILC/CMILC groups had the mean operative time of 88.1 31.8/74.4 ± 40.3 minutes (p < 0.01), with a range of 30 to 190/15 to 275 minutes. The mean operative time of SILC was significantly longer than CMILC, and the length of stay (LOS) was longer, of 4.6 versus 3.7 days. While, the postoperative 8-hour pain score was significantly lower, of 3.4 versus 4.2, and the number of postoperative narcotic doses was not. The requirement of one additional extra port was 9/0 cases of SILC/MILC, and conversion to open surgery of 2/5 cases. The first group was due to uncontrolled bleeding (2 cases), and the latter group was uncontrolled bleeding (2 cases), difficult anatomy/adhesion (2 cases), and common bile duct injury (1 case).

The SILC group, the postoperative complication included wound infection (1 case), acute pancreatitis (1 case), and infected subhepatic hematoma (2 cases), in comparison with CMILC of wound infection (2 cases), wound dehiscence (1 case), and common bile duct injury (1 case).

Discussion

The average operative time of SILC was significantly longer than CMILC, 88.1/74.4 minutes, was similar to two previous studies[2,7] of 41.3/35.6 and 126/95.8 minutes, as well as a systemic review[8]. The differences of operative time depended on surgeon and their learning curve[3,4].

The length of stay was similar to a study in Thailand[9], but a slightly longer of 1 to 3 days than international series[2-4,6,8]. The selected subjects of low risk criteria such as American Society of Anesthesiologists (ASA) class 1 or 2, and postoperative indicators of no surgical drainage or no immediate complication, may be helpful and established in terms length of stay[10].

The present study showed significantly lower pain score at 8-hour postoperative. The SILC had the

Table 1. Operative and postoperative results of SILC and CMILC

Results	SILC (n = 107)	CMILC (n = 108)	p-value
Mean operative time (mean ± SD, minutes) (range)	88.1 ± 31.8 (30 to 190)	74.4 ± 40.3 (15 to 275)	<0.01*
Length of stay (mean ± SD, days)	4.6 ± 4.0	3.7 ± 1.8	0.04*
Postoperative 8-hour pain score (mean ± SD)	3.4 ± 2.5	4.2 ± 2.5	0.03*

* Statistical significance

advantage of less incision, and did not involve the abdominal muscle, so it should have less pain theoretically[11], and supported by a number of randomized controlled trials[3,11].

The conversion to open surgery, the uncontrolled bleeding can seal and cut cystic artery completely with ultrasonic dissector, without clip[12,13]. In addition, bleeding from partial tear of an artery (*e.g.* the right hepatic artery) makes a troublesome situation. The suggestion is to keep the dissection close to the gallbladder wall, especially at the superior part of Hartman pouch could prevent this trouble[14,15].

The most serious complication in SILC group was infected subhepatic hematoma. Bleeding at gallbladder fossa was uncommon except in cirrhotic patient[16,17], but two cases of the study did not.

The transabdominal retraction sutures through the gallbladder were used to maintain a good view of the triangle of calot, in 25/51 cases (49.0%) of SILC[18]. The Fig. 1 was suggested to be a selective choice of optimal exposure.

In the present study the cholecystitis was not exclusion criteria, while in comparison with other studies[19,20], the cholecystitis was an exclusion criteria, the same as previous upper abdominal surgery, a BMI > 30 kg/m^2, suspicion of a malignancy, and the presence of a cystic duct stone. Whenever, the technical limitation could undoubtedly be overcome, the eligible criteria may accordingly be adapted.

In conclusion, preliminary results of the present study showed SILC to be safe compared with CMILC, although operative times were longer.

Potential conflicts of interest

None.

References

1. Reynolds W Jr. The first laparoscopic cholecystectomy. JSLS 2001; 5: 89-94.
2. Aprea G, Coppola BE, Guida F, Masone S, Persico G. Laparoendoscopic single site (LESS) versus classic video-laparoscopic cholecystectomy: a randomized prospective study. J Surg Res 2011; 166: e109-e112.
3. Bucher P, Pugin F, Buchs NC, Ostermann S, Morel P. Randomized clinical trial of laparoendoscopic single-site versus conventional laparoscopic cholecystectomy. Br J Surg 2011; 98: 1695-702.
4. Phillips MS, Marks JM, Roberts K, Tacchino R, Onders R, Denoto G, et al. Intermediate results of a prospective randomized controlled trial of traditional four-port laparoscopic cholecystectomy versus single-incision laparoscopic cholecystectomy. Surg Endosc 2011.
5. Navarra G, Pozza E, Occhionorelli S, Carcoforo P, Donini I. One-wound laparoscopic cholecystectomy. Br J Surg 1997; 84: 695.
6. Lai EC, Yang GP, Tang CN, Yih PC, Chan OC, Li MK. Prospective randomized comparative study of single incision laparoscopic cholecystectomy versus conventional four-port laparoscopic cholecystectomy. Am J Surg 2011; 202: 254-8.
7. Chow A, Purkayastha S, Aziz O, Pefanis D, Paraskeva P. Single-incision laparoscopic surgery for cholecystectomy: a retrospective comparison with 4-port laparoscopic cholecystectomy. Arch Surg 2010; 145: 1187-91.
8. Markar SR, Karthikesalingam A, Thrumurthy S, Muirhead L, Kinross J, Paraskeva P. Single-incision laparoscopic surgery (SILS) vs. conventional multiport cholecystectomy: systematic review and meta-analysis. Surg Endosc 2011 Dec 16. doi: 10.1007/s00464-011-2051-0.
9. Ruangsin S, Wanasuwannakul T, Sangkhathat S. Laparoscopic cholecystectomy in Songklanagarind Hospital. Songklanagarind Med J 2007; 25: 315-21.
10. Ruangsin S, Jaroonrach V, Petpichetchian C, Puttawibul P, Sunpaweravong S, Chewatanagongun S. Establishment the cost-effectiveness through set criteria of laparoscopic cholecystectomy. J Med Assoc Thai 2010; 93: 789-93.
11. Tsimoyiannis EC, Tsimogiannis KE, Pappas-Gogos G, Farantos C, Benetatos N, Mavridou P, et al. Different pain scores in single transumbilical incision laparoscopic cholecystectomy versus classic laparoscopic cholecystectomy: a randomized controlled trial. Surg Endosc 2010; 24: 1842-8.
12. Huscher CG, Lirici MM, Di Paola M, Crafa F, Napolitano C, Mereu A, et al. Laparoscopic cholecystectomy by ultrasonic dissection without cystic duct and artery ligature. Surg Endosc 2003; 17: 442-51.
13. Bessa SS, Al Fayoumi TA, Katri KM, Awad AT. Clipless laparoscopic cholecystectomy by ultrasonic dissection. J Laparoendosc Adv Surg Tech A 2008; 18: 593-8.
14. Gigot JF, Hubert C, Navez B. Cholecystectomy techniques. In: Borzellino G, Cordiano C, editors.

Biliary lithiasis: basic science, current diagnosis and management. Milan, Italy: Springer-Verlag Italia; 2008: 188-95.
15. Kaushik R. Bleeding complications in laparoscopic cholecystectomy: Incidence, mechanisms, prevention and management. J Minim Access Surg 2010; 6: 59-65.
16. Marakis GN, Pavlidis TE, Ballas K, Aimoniotou E, Psarras K, Karvounaris D, et al. Major complications during laparoscopic cholecystectomy. Int Surg 2007; 92: 142-6.
17. Lledo JB, Ibanez JC, Mayor LG, Juan MB. Laparoscopic cholecystectomy and liver cirrhosis. Surg Laparosc Endosc Percutan Tech 2011; 21: 391-5.
18. Lill S, Karvonen J, Hamalainen M, Falenius V, Rantala A, Gronroos JM, et al. Adoption of single incision laparoscopic cholecystectomy in small-volume hospitals: initial experiences of 51 consecutive procedures. Scand J Surg 2011; 100: 164-8.
19. Kuon Lee S, You YK, Park JH, Kim HJ, Lee KK, Kim DG. Single-port transumbilical laparoscopic cholecystectomy: a preliminary study in 37 patients with gallbladder disease. J Laparoendosc Adv Surg Tech A 2009; 19: 495-9.
20. Mutter D, Callari C, Diana M, Dallemagne B, Leroy J, Marescaux J. Single port laparoscopic cholecystectomy: which technique, which surgeon, for which patient? A study of the implementation in a teaching hospital. J Hepatobiliary Pancreat Sci 2011; 18: 453-7.

การผ่าตัดถุงน้ำดีผ่านกล้องแบบแผลเดียวเปรียบเทียบกับแบบหลายแผลตามแบบแผนเดิม ณ โรงพยาบาลหาดใหญ่

อารยะ ไข่มุกด์

วัตถุประสงค์: *เพื่อเปรียบเทียบการผ่าตัดถุงน้ำดีผ่านกล้องแบบแผลเดียวกับแบบหลายแผลตามแบบแผนเดิม*

วัสดุและวิธีการ: *เก็บข้อมูลย้อนหลังของผู้ป่วยผ่าตัดถุงน้ำดีผ่านกล้องแบบแผลเดียวและแบบหลายแผล ตามแบบแผนเดิม ณ โรงพยาบาลหาดใหญ่ ตั้งแต่กันยายน พ.ศ. 2552 ถึง ตุลาคม พ.ศ. 2554 ข้อมูลเก็บวิเคราะห์ ได้แก่ ระยะเวลาผ่าตัด ระยะเวลาอยู่โรงพยาบาล ความเจ็บปวดหลังผ่าตัด จำนวนครั้งที่ได้ยาระงับปวด การเปลี่ยนเป็นการผ่าตัดแบบเปิด และภาวะแทรกซ้อนหลังผ่าตัด*

ผลการศึกษา: *ผ่าตัดถุงน้ำดีผ่านกล้องแบบแผลเดียว/แบบหลายแผลตามแบบแผนเดิม มีผู้ป่วย 107/108 ราย การผ่าตัดแบบแผลเดียวมีระยะเวลาผ่าตัดนานกว่าอย่างมีนัยสำคัญ 81.1/74.4 นาที ($p < 0.001$) ต้องใส่ท่อเพิ่ม 9/0 ราย และเปลี่ยนเป็นการผ่าตัดแบบเปิด 2/5 ราย ส่วนระยะเวลาอยู่โรงพยาบาล 4.6/3.7 วัน ($p = 0.04$) ค่าเฉลี่ยความเจ็บปวดหลังผ่าตัด 8 ชั่วโมง 3.4/4.2 คะแนน ($p = 0.03$) การผ่าตัดแบบแผลเดียวมีระยะเวลาอยู่ในโรงพยาบาลยาวกว่า และความเจ็บปวดน้อยกว่าอย่างมีนัยสำคัญ ทั้งสองกลุ่มมีภาวะแทรกซ้อนในสัดส่วนใกล้เคียงกัน*

สรุป: *ผลการศึกษาเบื้องต้นแสดงว่าการผ่าตัดถุงน้ำดีผ่านกล้องแบบแผลเดียวปลอดภัยเพื่อเปรียบเทียบกับแบบหลายแผลตามแบบแผนเดิม แม้ว่าระยะเวลาผ่าตัดนานกว่า*