Original Article

Single Incision Laparoscopic Appendectomy (SILA) by Conventional Laparoscopic Instruments; An Initial Single Surgeon Experience of 30 Cases of Uncomplicated Acute Appendicitis at Sharif Medical City Hospital, Lahore

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ABSTRACT:

Objective: To describe our initial experience of simplified and low cost SILA technique carried out with conventional laparoscopic instruments.

Methodology: This prospective study was conducted from December 2014 to May 2015 at Sharif Medical City Hospital, Lahore. We accomplished SILA among 30 cases for uncomplicated acute appendicitis using conventional non reticulating laparoscopic instruments, 0° telescope, two 10 mm ports and a directly introduced non reticulating curved grasper through the same skin incision without the use of any port that served to hold the appendix. The appendicular artery was secured with liga clips without use of ultrasonic shear. The ligation of appendix was performed by Vicryl no. 1/0. No special technique was used to retrieve appendix specimen.

Results: SILA were completed in all patients successfully without the need of additional port in the same or through separate skin incision or conversion to an open approach. The mean operative time was 22.65±1.04 minutes. All patients were discharged within two days. No significant intraoperative or postoperative complications were noted over a period of two months follow up. Wound healed in all patients with an invisible scar.

Conclusion: The single incision laparoscopic appendectomy technique by using conventional non reticulating laparoscopic instruments in this study is cost effective. It is safe for treatment of patients with uncomplicated acute appendicitis. Thus, it can be performed in a hospital equipped with basic laparoscopic surgical instruments.

Key word: *Single incision laparoscopic appendectomy. 0° telescope. Conventional.*

INTRODUCTION

Acute appendicitis is the most common disease requiring emergency surgery in the surgical field and appendectomies being one of the most basic surgeries for the surgeons.[1]

The open appendectomy was performed first by McBurney in 1894 and since then, it is the gold standard treatment for acute appendicitis.[2] With the introduction of laparoscopy by Semm in1983, the laparoscopic appendectomy has been conducted more frequently than the open appendectomy due to its advantages of being minimally invasive and having a shorter length of stay accompanied by a faster return of bowel function, decreased use of narcotics and lower rates of wound complications.[3-5] During the era of laparoscopic surgery, common trend has been towards less invasive techniques and a natural extension of the trend is to perform operations without scars.[6,7] Today, the two most prominent techniques for scarless surgery are transumbilical single-incision laparoscopic surgery (SILS) and natural orifice transluminal endoscopic surgery (NOTES). However, NOTES is not very popular due to its technical and logistic difficulties. SILS seems to be ready for wider use in surgical community.[8,9] The first report of single-incision laparoscopic surgery was in 1992 by Pelosi who performed a laparoscopic appendectomy, and in 1997 by Navarra who performed a SILS cholecystectomy.[10,11]

Here we mention the initial experience of simple and low cost technique of SILA among patients with uncomplicated acute appendicitis, with the use of conventional laparoscopic instruments. This technique can be converted at any time to conventional multi incision, multi ports laparoscopic appendectomy or open approach, if required.

METHODOLOGY

Thirty patients with uncomplicated acute appendicitis underwent SILA by a single surgeon (having at least 5 years experience of performing laparoscopic surgeries) from December 2014 to May 2015 at Sharif Medical City Hospital, Lahore.

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All patients were fully informed about the SILA surgery and other possible therapeutic options, including traditional multi incision laparoscopic and open appendectomy. Written informed consent was provided by all patients. The study was approved by Hospital Ethical Committee.

The operation was performed through single transumbilical skin incision using conventional laparoscopic instruments, 0° laparoscope, non reticulating laparoscopic instruments and ordinary electro cautery with help of two 10mm ports and directly introduced curved grasper, that helped to suspend appendix during procedure.

All outcomes including blood loss, operative time, complications, length of stay and pain were recorded along with patients' data. Data was analyzed using SPSS version 20.0.

Patients of all age groups and both gender with uncomplicated acute appendicitis diagnosed on clinical evidence provided by history, physical examination, abdominal ultrasonography and abdominal computed tomography scan were included in the study.

Patients with evidence of appendicular mass, perforated or gangrenous base of appendix, abscess formation, diffuse peritonitis, dense adhesion, abnormal position of appendix and any other pathology on clinical and radiological exam and those with contraindication for general anaesthesia and pneumoperitoneum were excluded from the study.

Surgical Technique

All patients received intravenous 1st generation cephalosporin at induction of anaesthesia. After surgery, patients were administered two or more doses of antibiotics. Preoperative preparation and anaesthesia were performed in the standard manner. When performing SILA, the umbilicus was cleaned thoroughly using standard 10% iodine soaked cotton swabs. Manual evacuation of debris was done routinely.

In SILA, a 1.5-2.0 cm longitudinal skin incision was made through the everted umbilicus and we used a Verres needle followed by a closed access method for establishing the pneumoperitoneum, that was initiated to a pressure of 12 mm Hg. Two ports of 10mm were introduced through linea alba in the midline, above and below umbilicus. Both ports were placed through the same skin incision but at different fascial incisions.The patient was then put in a Trendelenburg position and rotated to the left to secure easy access to appendix.

A 10mm 0° optic fibre was used in all operations that was inserted through one port. We visualized the location of the appendix by using two straight instruments, one through the second 10mm port that explored the right lower abdominal quadrant and other instrument (curved non reticulating grasper) was embedded directly through same skin incision but a separate facial defect to suspend appendix (Figure 1).

In all patients, mesoappendix was dealt with electrocautery and laparoscopic scissors after securing appendicular artery with liga clips LT 300 on a standard 10mm clip applier. Subsequently, the exposed base of appendix was ligated using extracorporeal roaders knot with absorbable suture (Vicryl 1/0) (Figure 2). The resected appendix was taken out through 10mm port. There was no need of any bag to remove the resected appendix, since the wound retractor protected the entire circumference of the incision from contamination in case of any difficulty in extraction of specimen and the need for extension of facial incision.

Hemostasis and complications such as intestinal perforation in the abdominal cavity had been confirmed at the end of the procedure. No drainage was required in any of the patients. Ports and grasper were removed under vision and abdomen was deflated. Fascia was closed carefully with interrupted non absorbable suture (Prolene 2/0) and the skin was also closed in the same manner. After adequate closure, the immediate cosmetic effect was excellent (Figure 3). A gauze ball was placed on the depression of the umbilicus.

All patients were allowed a clear fluid diet after full recovery from general anaesthesia and semisolid diet was allowed as tolerated. All patients recovered well and were discharged in good condition without any complications.

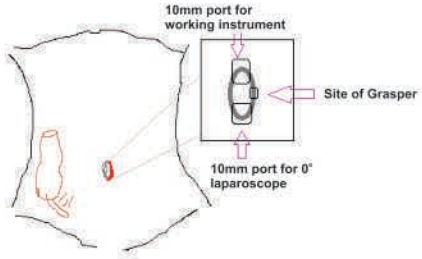

Figure 1: Location of both 10mm ports and directly introduced grasper through umbilicus

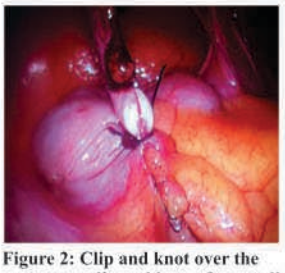

Figure 2: Clip and knot over the mesoappendix and base of appendix

Figure 3: Closed wound of SILA

RESULTS

The mean age of patients in this study was 26.25±5.04 years. 11 (36.67%) patients were male and 19 (63.33%) were female. 15 (50%) out of 30 had normal body mass index (BMI), 12(40%) were overweight and 3(10%) were obese. 8 patients were with comorbid conditions, 4 with controlled diabetes mellitus (M:F, 3:1), 4 with controlled hypertension (all females). Only one male patient was cigarette smoker. 9 females had past history of caesarian section.

In spite of technical difficulties and disorientation especially in the first few cases, the mean operative time was 22.65±1.04minutes.There were no conversions to multi incision conventional laparoscopy or open appendectomy.The mean postoperative stay was 1.01±2.01 days.

Following are the mean operative time (Table 1) and complications of procedure (Table 2).

DISCUSSION

Laparoscopic appendectomy is widely performed for the treatment of acute appendicitis. Single port laparoscopic appendectomy is rapidly gaining admiration due to improved cosmesis and reduced parietal trauma.[12-14]

Several single port systems have been used to introduce laparoscopic instruments into the abdominal cavity. Some authors have reported the use of pre-manufactured one port systems.[15-18] Others have reported on the glove port method.[19,20] In this study, two 10mm traditional laparoscopic ports for SILA were utilized and direct non stop use of non reticulating grasper all through umbilicus.

Performing SILA requires experience in laparoscopic surgery and a certain number of cases must be performed to overcome the learning curve. In this study, the mean operation time was 22.65±1.04 minutes. The cases in the beginning phase took longer than average. As the cases accumulated, operator experience was gained, the operation time started to shorten.

No patient required drainage and conversion to multi incision laparoscopic or open appendectomy; keeping the SILA meaningful for uncomplicated acute appendicitis.

The lower incidence of surgical site infection is one of the primary advantages of laparoscopic appendectomy over conventional surgery. In the report of Oltmann, they reported the incidence of wound complication up to 1(5.2%) and Visnjic reported as 4 (13.7%).[21,22] The higher incidence of port site infection could be expected in single incision laparoscopic surgery for appendectomy than conventional 3-port laparoscopic appendectomy, especially in extracorporeal appendectomy due to the exposure and manipulation of the appendix on the incision site. Therefore, an adjusted operative technique using minimal, gentle movements and adequate wound protection is required. We routinely used 10mm port for extraction of specimen or a wound retractor/ gauze for wound protection in case of direct retrieval of large sized specimen through the wound after extending the facial incision. Neither wound seroma nor wound infection developed in any of the cases. To minimize the operative bias, all the surgeries were performed by a single surgeon.

There are certain limitations. This is a single center study, with a limited sample size. A series of studies on larger patient groups should be conducted if SILA with conventional laparoscopic instruments is to be established as the preferred feasible and low cost

Table 1: Mean operative time of the procedure

No. of cases	Mean operative time (min.)
First 10 cases	51.15±6.43
Next 10-20 cases	39.12±2.09
Last 10 cases	18.94±9.04

Table 2: Complications of the procedure

Parameters			No. of patients	Percentage (%)
Intraoperative complications	Intraoperative Hemorrhage		0	0
	Iatrogenic Gut injury		0	0
Postoperative complications	Port site complications	Seroma	0	0
		Hematoma	1	3.33
		Infection	0	0
	Pelvic abscess		0	0
	Urinary retention		0	0
	Paralytic ileus		0	0
Re – exploration			0	0
Mortality (within hospital stay)			0	0

scarless surgery for uncomplicated acute appendicitis patients.

CONCLUSION

SILA technique with conventional laparoscopic instruments is feasible, safe and low cost for uncomplicated acute appendicitis and for explorative laparoscopy as well.

REFERENCES

1. Masoomi H, Nguyen NT, Dolich MO, Wikholm L, Naderi N, Mills S, Stamos MJ. Comparison of laparoscopic versus open appendectomy for acute non-perforated and perforated appendicitis in the obese population. Am J Surg. 2011 Dec;202(6):733-8.
2. McBurney C. The incision made in the abdominal wall in cases of appendicitis, with a description of a new method of operating. Ann Surg. 1894 Jul;20(1):38-43.
3. Semm K. Endoscopic appendectomy. Endoscopy. 1983 Mar;15(2):59-64
4. Rispoli G, Armellino MF, Esposito C. One-trocar appendectomy. Surg Endosc. 2002 May;16(5):833-5.
5. D'ambra L, Berti S, Bonfante P, Bianchi C, Magistrelli P, BiancoA, Gianquinto D, Feleppa C, Deidda E, Falco E. Laparoscopic appendectomy for complicated acute appendicitis. G Chir. 2011 Apr;32(4):181-4.
6. Rehman H, Rao AM, Ahmed I. Single incision versus conventional multi-incision appendicectomy for suspected appendicitis. Cochrane Database Syst Rev. 2011 Jul 6;(7):CD009022.
7. Chouillard E, Dache A, Torcivia A, Helmy N, Ruseykin I, GumbsA. Single-incision laparoscopic appendectomy for acute appendicitis: A preliminary experience. Surg Endosc. 2010 Aug;24(8):1861-5.
8. Hansen EN, Muensterer OJ, Georgeson KE, Harmon CM. Single incision pediatric endosurgery: Lessons learned from our first 224 laparoendoscopic single-site procedures in children. Pediatr Surg Int. 2011 Jun;27(6):643-8.
9. Garey CL, Laituri CA, Ostlie DJ, St Peter SD. A review of single site minimally invasive surgery in infants and children. Pediatr Surg Int. 2010 May;26(5):451-6.
10. Pelosi MA, Pelosi MA 3rd. Laparoscopic appendectomy using a single umbilical puncture (minilaparoscopy).J Reprod Med. 1992 Jul;37(7):588-94.
11. Navarra G, Pozza E, Occhionorelli S, Carcoforo P, Donini I. One-wound laparoscopic cholecystectomy.Br J Surg. 1997 May;84(5):695.
12. Hong TH, Kim HL, Lee YS, Kim JJ, Lee KH, You YK, Oh SJ, Park SM. Trans umbilical single-port laparoscopic appendectomy (TUSPLA): Scarless intracorporeal appendectomy. J Laparoendosc Adv Surg Tech A. 2009 Feb;19(1):75-8.
13. Vidal O, Valentini M, Ginestà C, Martí J, Espert JJ, Benarroch G, García-Valdecasas JC. Laparoendoscopic single-site surgery appendectomy. Surg Endosc. 2010 Mar;24(3):686-91.
14. Saber AA, Elgamal MH, El-Ghazaly TH, Dewoolkar AV, Akl A. Simple technique for single incision trans umbilical laparoscopic appendectomy. Int J Surg. 2010;8(2):128-30.
15. Ito M, Asano Y, Horiguchi A, Shimizu T, Yamamoto T, Uyama I, Miyakawa S.Cholecystectomy using single-incision laparoscopic surgery with a new SILS port. J Hepatobiliary Pancreat Sci. 2010 Sep;17(5):688-91.
16. Song T, Kim TJ, Kang HJ, Choi CH, Lee JW, Bae DS, Kim BG. Single-port access laparoscopic surgery using a novel laparoscopic port (Octo-Port). Taiwan J Obstet Gynecol. 2011 Dec;50(4):436-40.
17. Saber AA, El-Ghazaly TH. Early experience with single incision transumbilical laparoscopic adjustable gastric banding using the SILS Port. Int J Surg. 2009 Oct;7(5):456-9.
18. Saber AA, El-Ghazaly TH. Single-incision transumbilical laparoscopic right hemicolectomy using SILS Port. Am Surg. 2011 Feb;77(2):252-3.
19. Lee YS, Kim JH, Moon EJ, Kim JJ, Lee KH, Oh SJ, Park SM, Hong TH. Comparative study on surgical outcomes and operative costs of transumbilical single-port laparoscopic appendectomy versus conventional laparoscopic appendectomy in adult patients. Surg Laparosc Endosc Percutan Tech. 2009 Dec;19(6):493-6.
20. Kim HJ, Lee JI, Lee YS, Lee IK, Park JH, Lee SK, Kang WK, Cho HM, You YK, Oh ST. Single-port transumbilical laparoscopic appendectomy: 43 consecutive cases. Surg Endosc. 2010 Nov;24(11):2765-9.
21. Oltmann SC, Garcia NM, Ventura B, Mitchell I, Fischer AC. Single-incision laparoscopic surgery: Feasibility for pediatric appendectomies. J Pediatr Surg. 2010 Jun;45(6):1208-12.
22. Visnjic S. Transumbilical laparoscopically assisted appendectomy in children: High-tech low-budget surgery. Surg Endosc. 2008 Jul;22(7):1667-71.