

Study of (Single Incision Laproscopic Surgery) Sils & Other Modification of Laproscopic Appendicectomy



Medical Science

KEYWORDS : appendicitis, single incision laparoscopic surgery(SILS),single incision laparoscopic appendicectomy (SILA) & other modification of conventional laparoscopic appendicectomy.

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ABSTRACT

The next advancement in the field of minimally invasive surgery, in the recent times, has been the use of single incision for accessing the abdominal cavity. potential benefits of single incision laparoscopic surgery(SILS) are decreased postoperative pain, reduced port site complication and early recovery. we report case study of various technique of single incision laparoscopic appendicectomy(SILA) by employing conventional laparoscopic instruments without the need for any expensive specialized equipment.

Design : prospective randomised controlled trial

Subjects : 20 patients , diagnosed with appendicitis who underwent single incision laparoscopic appendicectomy and other modification of conventional laparoscopic appendicectomy from May 2011 to December 2013.

Intervention : SILA(using triport)-11 cases,SILA(using suture passing needle)-03 cases,SILA(using epidural needle)-03 cases,DILA(double incision laparoscopic appendicectomy)-03 cases

Outcome measures :

- *operative technique*
- *Operating time & learning curve*
- *Unfavorable intra-operative inadvertent events &*
- *post-operative pain, complications*
- *cost effectiveness.*

INTRODUCTION

Appendicectomy is the most common abdominal emergency operation performed in the world. Appendectomies, now a days, are performed laparoscopically very routinely, as advantages in terms of more accurate diagnosis, diminished wound infection ,more rapid recovery and better cosmesis compare to open appendicectomy.

A new era has been opened with many innovations in the minimal access surgery that have pioneered the use of single-incision laparoscopic surgery (SILS) or Single Port Access (SPA).

First report of single incision laparoscopic appendicectomy technique was performed in 1992 and showed the new approach as a safe, inexpensive, and effective alternative to the currently used multiple-incision method(conventional laparoscopic appendicectomy).^[1]

The new transumbilical approach seems to reduce the trauma of surgical access with its improvement of the postoperative pain and patient cosmesis compared to conventional laparoscopic approach. However, other important issues must be critically analyzed such as time consumed, complications and difficulties to perform this novel technique. This new technique has been introduced to the surgical community and we have concentrated on knowing about the feasibility, safety, and any advantage of the method. For these reasons, in order to implement SILS appendicectomy and other modification of

laparoscopic appendicectomy, and also to know its difficulties, limitations, or advantages, we conducted this study. The aim of the study is to know if SILS appendicectomy would offer similar operative time, length of stay, and complication but with better cosmesis and less postoperative pain as compare to conventional laparoscopic appendicectomy.

MATERIALS AND METHODS

- The study named "Study of (single incision laproscopic surgery)SILS & other modification of laproscopic appendicectomy" was conducted in the department of general surgery in our institute e.g. B.J.MEDICAL COLLEGE & CIVIL HOSPITAL, AHMEDABAD from may 2011 to December 2013.
- The study is a prospective randomised controlled trial performed on randomly selected 20 patients operated as either SILS-appendicectomy or operated as per other modification of laparoscopic appendicectomy having diagnosis of appendicitis.

Inclusion Criteria:

- Patient with confirmed diagnosis of appendicitis were included. Diagnosis was confirmed on clinical, laboratory, radiological criteria and as per MANTRELS score.

Exclusion Criteria:

- Appendicular mass
- Appendicular abscess
- Perforated appendix with peritonitis

- Prior open laparotomy with incision through the umbilicus
- Age <12 years
- Mental illness, dementia, or inability to provide informed consent
- Chronic pain requiring daily medication (including opiate and NSAIDs)
- Pregnancy
- All prospective patient listed for appendectomy were counselled for different technique of appendectomy, written consent was taken for surgery/anaesthesia along with consent for modified technique.

Different methods used in present study :

In this study total 20 laparoscopic appendectomy performed.

1. SILA (triport)-11 cases(fig.1)
2. SILA (suture passing needle)-03 cases(fig.2)
3. SILA (epidural needle)-03 cases(fig.3)
4. DILA (Double incision laparoscopic appendectomy) -03 cases(fig.4)



Fig. : 1 SILA(triport)



Fig. 2 SILA(suture passing needle)

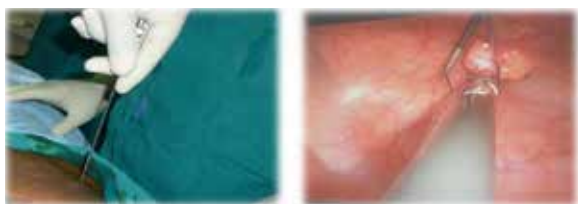


Fig. 3 SILA(epidural needle)



Fig. 4 DILA(Double incision laparoscopic appendectomy)

OBSERVATION AND DISCUSSION

Table : 1 Operative time in present study

OPERATIVE TIME(MINS.)	SILA TRIPORT	SILA SUTURE PASSING NEEDLE	SILA EPIDUREAL NEEDLE	DILA
31-40	0	0	0	0
41-50	1	0	0	1
51-60	0	0	0	1
61-70	1	0	1	0
71-80	3	0	1	1
81-90	4	2	1	0
91-100	1	1	0	0
101-110	0	0	0	0
111-120	1	0	0	0

STUDY	MEAN OPERATIVE TIME(in min.)
Lee et al[2]2009	41
Chow et al[3]2010	60
Raakow et al[4]2011	48
Amaos et al[5]2011	41.37
Park et al[6]2012	51.6
Present Study	81.77

The mean operative time in our study by laparoscopic method was 81.77 minutes.

The above studies show a decreased operative time in performing SILA. Our study has the maximum operative time in because of initial experience, difficulty in using rotating instruments, instrumental crowding.

However, operating time may decrease in future with further experience.

Table : 2 Conversion in present study

	NO	CONVENTIONAL LAP APPENDICECTOMY	OPEN APPENDICECTOMY
SILA TRIPORT	9	2	0
SILA SUTURE PASSING NEEDLE	2	0	1
SILA EPIDUREAL NEEDLE	2	1	0
DILA	3	0	0

Out of 20 patient in our study 9 patients operated by SILA using TRIPORT, 2 patients had been converted to conventional laparoscopic appendectomy.

it was because that were the first 2 patients in which SILA TRIPORT method done and due to initial new experience, compounded with instrumental triangulation and crowding of instruments this patients were converted to CLA early. thereafter there was no conversion in SILA TRIPORT method.

Out of 3 patients operated by SILA using SUTURE PASSING NEEDLE 1 patient had to be converted to open appendectomy

This was done because of a band passing from anti mesentry border of distal ileum to anterior abdominal wall which was not properly being evaluated.

Out of 3 patients operated by SILA using EPIDURAL NEEDLE 1 patient had to be covered to conventional laparoscopic appendectomy

This was because of appendix was situated sub hepatic and retrocecal position having operative difficulties.

Table : 3 Complications in present study

Complication	Sila Triport	Sila Suture Passing Needle	Sila Epidural Needle	Dila
Nil	10	2	2	3
Surgical Site Infection	0	1	1	0
Paralytic Ileus	1	0	0	0
Intra Abdominal Abscess	0	0	0	0
Intestinal Obstruction	0	0	0	0

Out of the 20 patients undergoing SILA only 2 patients suffered from **Surgical site infection**, one patient had *Pseudomonas Aeruginosa* in the culture sensitivity report, which was sensitive to Cefoperazone + sulbactam, Piperacilin Tazobactam, Levofloxacin, Tigecycline. The patient was then given Oral Levofloxacin for 7 days and was cured of SSI.

In SILA TRIPORT method, 1 patient developed **Paralytic Ileus** in the immediate post-operative period the patient was managed conservatively.

Study	Year	Cases	Complication	Incidence
Lee Et Al[2]	2009	72	7	9.72%
Chow Et Al[3]	2010	40	2	5.00%
Raakow Et Al[4]	2011	20	1	5.00%
Amaos Et Al[5]	2011	27	0	0.00%
Park Et Al[6]	2012	46	2	4.34%
Present Study	2013	20	3	15.00%

The rate of complication in our study is 15%, the rate of SSI in our study is 10% and rate of paralytic ileus is 5%.

In studies from 2009 to 2012, initial years complication rate is high in Lee et al [2] and then gradually tapper as shown in table.

The higher rate of complication in present study may be due to small size of study, which may be comparable to other studies if size of study is larger.

Table : 4 Post op Pain in present study

Vas (Mean)	Sila Triport	Sila Suture Passing Needle	Sila Epidural Needle	Dila
Pod-1	7.18	6.33	5.66	6.66
Pod-2	3.36	4	3.33	3.66
Pod-7	1.63	2	1.66	1.66

The mean Post-op. Pain intensity by Visual Analogue Scale on Post-operative Day 1 in SILA -TRIPORT was 7.18, SILA-SUTURE PASSING NEEDLE was 6.33, SILA-EPIDURAL NEEDLE was 5.66, DILA was 6.66.

This on post-operative Day 2, SILA -TRIPORT was 3.66, SILA-SUTURE PASSING NEEDLE was 4, SILA-EPIDURAL NEEDLE was 3.33, DILA was 3.66.

On postoperative day 7, Pain intensity difference SILA -TRIPORT was 1.63, SILA-SUTURE PASSING NEEDLE was 2, SILA-EPIDURAL NEEDLE was 1.66, DILA was 1.66 which is statistically insignificant.

There was no any significant result observed in comparing post operative pain intensity (V.A.S) score in all procedure in all post operative day at 95% confidence limit at degree of freedom= 12 (unpaired t test =0.07 so p>0.05).

Patients undergoing, SILA-EPIDURAL NEEDLE suffered low intensity of pain on POD 1, POD2 and even a week after the operation.

Table :5 COST (RS.) (APPROX.)

Being a government institute, patient generally do not bear any cost, However government is spending. We have calculated the approximate average cost as follows. Data was collected from civil hospital. In all four method hospital spend around Rs. 1500-2000 average on hospital stay, drugs, food etc. per patient

Though TRIPORT was available free of cost in our institute, it costs around Rs. 18000 to the institute.

Cost (Rs. approx.)	Sila Triport	Sila Suture Passing Needle	Sila Epidural Needle	Dila
1000-2000	0	3	3	3
2100-18000	0	0	0	0
18000-22000	11	0	0	0

Out of 20 patients 11 patients were operated by SILA using TRIPORT. So approx. Cost was range in between Rs.18000-22000 per patient.

While other 9 patients in which 3 of each was operated by SILA using SUTURE PASSING NEEDLE, SILA using EPIDURAL NEEDLE and DILA.

All three method was performed by using conventional laparoscopic instruments. so approx. Cost was in range between Rs.1000-2000.

Thus, SILA using triport is much more costlier then any other method in this study.

SUMMARY

- DILA modification was used in 3 patients out of 20. As far operative technique was concerned, DILA was technically more easy to perform surgery as it involved 2 working port same as in conventional laparoscopic appendicectomy.
- The mean operative time in this study was 82 minutes. It ranged from minimum 45 minutes to maximum 120 minutes.
- SILA-SUTURE PASSING NEEDLE (3 patients out of 20) and SILA -EPIDURAL NEEDLE (3 patients out of 20) method had difficulty in the manoeuvring of appendix.
- SILA-TRIPORT method was used in 11 patients out of 20. This method had initial difficulty of working with angulated telescope and curved instruments leading to conversion in first 2 patients (18%). However in the subsequent 9 patients (82%), appendicectomy was done successfully.
- Learning curve was least in DILA modification, moderate in both SILA-SUTURE PASSING NEEDLE and SILA -EPIDURAL NEEDLE modification and more in SILA-TRIPORT.
- One patient suffered paralytic ileus following SILA using TRIPORT modification which was managed conservatively. Surgical site infection (SSI) was seen in both SILA-SUTURE PASSING NEEDLE and SILA -EPIDURAL NEEDLE method, one patient each.
- No intra operative complication was seen in the study
- No minor or major anesthesia related complication was seen in the study.
- There was no mortality in the study.
- The rate of post-op complication in the study is 15%. The high rate of complication may be due to small size of study, which may be comparable to other studies if size of study is larger.
- The study showed a conversion rate of 20% which was the highest when compared to other studies.
- Hospital stay remained important in calculating the total cost of the operation. The actually stay of the patient in the hospital was compared by the post-operative stay. The

mean post operative stay in this study was 2.45 days.

- Literatures detailing cost analysis are conflicting and vary according to the standpoint of the disease, the patient, the surgeon, the treatment centre, industry and society. Cost calculation is made differently in different studies. We considered Hospital stay (total length of stay) as well the Anaesthesia in calculating the cost of the patient.
- The study shows significant increase in the cost to the patients undergoing SILA using TRIPORT. However this can be attributed to the cost of TRIPORT (approxRs./-18000) per patients which was also provided by institute. However, other three method were cheaper then SILA using TRIPORT method.
- The mean time (in days) to resume routine work was 11.4 days.
- All patients were satisfied with the procedures and its cosmetic outcome.

CONCLUSION

- The surgical technique for laparoscopic appendicectomy is well established.
- In the era of minimal invasive surgery, laparoscopic appendicectomy is further minimised by different modification in the technique.
- Different modified technique of laparoscopic appendicectomy is technically feasible and safe to perform.
- All four methods are very satisfactory in its outcome and very good in terms of cosmesis. It provides almost scarless surgery to the patient.
- DILA method is easiest to perform, having least learning curve, cheapest in terms of cost and requires no additional setup or instrumentation..DILA is a technical bridge for up gradation from laparoscopic appendicectomy to SILS-appendicectomy.
- SILA-SUTURE PASSING NEEDLE and SILA –EPIDURAL NEEDLE method are comparable to DILA, requires moderate learning curve without any additional setup.
- SILA-TRIPORT(olympus) method is the costliest one, requires additional setup like endoeye scope, curved instruments and SILS PORT(TRIPORT).
- SILA-TRIPORT method has initial learning curve, leading to initial longer operative time and higher conversion rate, however it can be minimised with increasing experience.
- More studies are needed of DILA, SILA-SUTURE PASSING NEEDLE and SILA –EPIDURAL NEEDLE method to establish its effectiveness, so poor patients of public teaching hospital are benefited of SINGLE INCISION LAPAROSCOPIC SURGERY without extra financial burden to the institute and society in general.

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