

# Feasibility of Single Incision Laparoscopic Appendectomy with Conventional Instruments

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## Abstract

**Background:** Surgeons are striving to reduce the access trauma of surgical procedures. This study has been performed to assess the feasibility of single incision laparoscopic appendectomy (SILA).

**Materials and Methods:** 54 patients with a provisional diagnosis of acute or chronic appendicitis were taken up for diagnostic laparoscopy proceeding to SILA.

**Results:** 51 patients underwent successful SILA. Two patients, on diagnostic laparoscopy had a different diagnosis and were excluded from the study. Of these, one was diagnosed as right pyosalpinx and the other with ileocecal mass. One patient with acute appendicitis had a sloughed out base of appendix and needed conversion to conventional laparoscopy to successfully complete the surgery and hence was excluded from the study.

**Conclusions:** In experienced hands it is feasible to perform SILA.

**Key words:** Conventional instruments, Novel technique, Single incision laparoscopic appendectomy, Single incision laparoscopy

## INTRODUCTION

In 1901, Kelling performed the first laparoscopic examination of abdomen. It took more than 80 years before the first laparoscopic appendectomy was performed by Semm in 1983. Laparoscopic appendectomy for acute appendicitis was performed by Schreiber in 1987.<sup>1</sup> Since then, there has been a significant change in our understanding and experience with laparoscopy which has been aided by rapid technological advancements. Laparoscopy has rapidly evolved to include natural orifice and single incision surgery.

Presently, laparoscopic appendectomy is being widely performed. The technology has now percolated to even government and teaching institutes in our country. The safety and efficacy has been proven in various reports and has become the gold standard now.<sup>2,3</sup> The advantages include better diagnostic capability, reduced morbidity, and postoperative disability and early return to work.<sup>1-4</sup>

There have been various reports where single incision surgery is being performed using special single use disposable ports. There have been reports of modifications to this technique using indigenous ports. Both these technique involve a larger incision on the abdominal fascia. We are presenting a different technique using conventional ports and without increasing the incision on the fascial sheath.

## MATERIALS AND METHODS

54 consecutive patients diagnosed as acute or chronic appendicitis were included in the study. All the patients

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Month of Submission : 06-2016  
Month of Peer Review : 07-2016  
Month of Acceptance : 08-2016  
Month of Publishing : 08-2016

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have been operated by senior surgeon with 10 or more years of laparoscopic surgery experience. The procedures were performed under general anesthesia. Diagnostic laparoscopy was performed for confirmation, followed by appendectomy. Patients were excluded, if a diagnosis other than appendicitis was established. Insertion of additional ports was documented. Conversion to conventional multiport or open appendectomy excluded the patients from the study.

### Technique

Conventional reusable laparoscopy instruments were used for the procedure. A 1.5-2 cm single incision was taken along the curve of the umbilicus transversely. In case of small umbilicus the incision was vertical in the umbilicus. Peritoneal access was established using Veress needle. Two conventional reusable 5 mm ports were placed through the same incision but different fascial opening, one below the other. A 5 mm 30° telescope was inserted through one of the ports. An atraumatic Babcock grasper was placed through the other port (Figures 1 and 2).



Figure 1: External view of port position

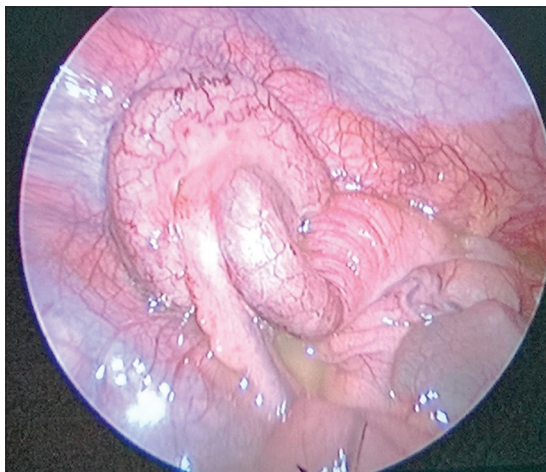


Figure 2: Acute inflamed oedematous appendix with purulent collection

A general scan of the abdomen was performed followed by examination of the terminal ileum and cecum ascending colon by bowel walk. In female patients, examination of uterus, ovary fallopian tubes, and adnexa was also performed.

In the right iliac fossa close to the base of appendix through a 2 mm stab incision a 2 mm assisting instrument was placed. This assist instrument is a 2 mm grasper or a suture passer. The appendix is grasped and lifted up. The mesoappendix is then coagulated using a bipolar grasper inserted through the umbilical port and then divided using a laparoscopic scissor. Two ports have been placed in umbilicus of which one is for the telescope. This leaves one working port necessitating repeated instrument changes. In multiple steps the mesoappendix is coagulated with bipolar grasper and then divided. The appendix is finally bared up to the base (Figures 3 and 4).

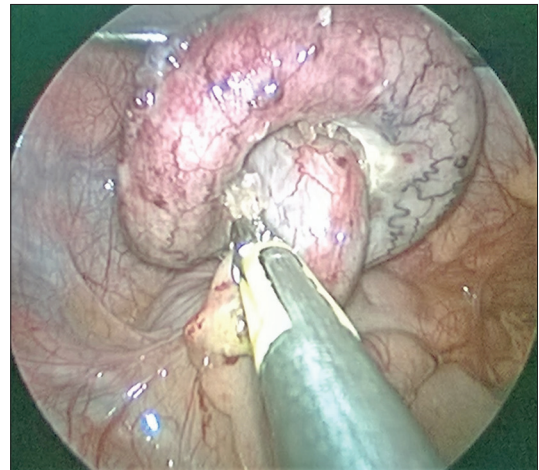


Figure 3: Mesoappendix being coagulated with bipolar Maryland grasper

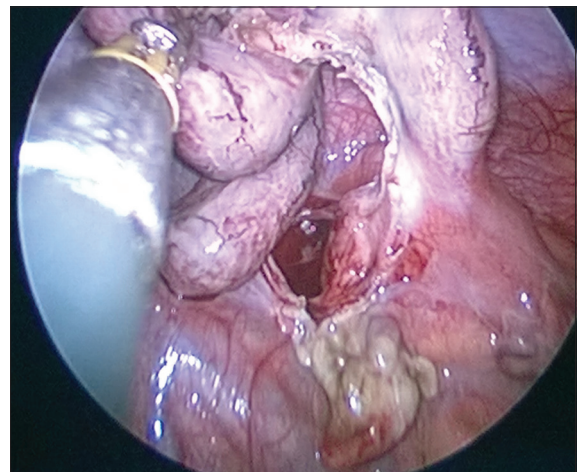


Figure 4: Mesoappendix divided and appendix bared upto the base



The base of appendix is ligated doubly on the body side and the third ligature is placed on slight away from the second. The ligatures are placed by making a Roeder's knot with No 1 Vicryl on a Knot Pusher. The appendix is then divided between the ligature to avoid contamination. The assisting 2 mm instrument is removed under vision. One of the 5 mm ports are replaced by a 10 mm port and the appendix is caught and removed with a claw forceps through the 10 mm port (Figure 5).

Using the 10mm port makes specimen extraction comfortable and avoids contamination of the wound. Hemostasis is confirmed and the ports withdrawn. About 5 ml 2% Lignocaine mixed with 5 ml 0.5% Bupivacaine is infiltrated in the wound for pain relief. Both 10 mm and 5 mm ports are closed with No 1 Vicryl, wound is lavaged and skin closed using 3-0 Nylon (Figures 6 and 7).

## RESULTS

54 consecutive patients diagnosed as acute or chronic appendicitis with indication for surgery were studied. Two patients were excluded; of which one was having right pyosalpinx and the other had ileocecal mass. In addition to this; in one patient, the base of appendix had sloughed off. The sloughed off stump was buried with an intracorporeal purse string suture on the cecum by conversion to conventional three port laparoscopy.

Remaining 51 patients underwent successful single incision laparoscopic appendectomy (SILA). There was almost equal male-female distribution and the mean age was 20.39 years. Majority of the patients underwent elective surgery for chronic appendicitis. The mean operative time was 30.49 min. Oral feeds were allowed 6 h after the procedure. Patients for elective surgery for chronic appendicitis were admitted on the day of surgery and discharged the

next day. Patients operated for acute appendicitis were discharged once the inflammation had subsided; usually on the 2<sup>nd</sup> or 3<sup>rd</sup> day after surgery.

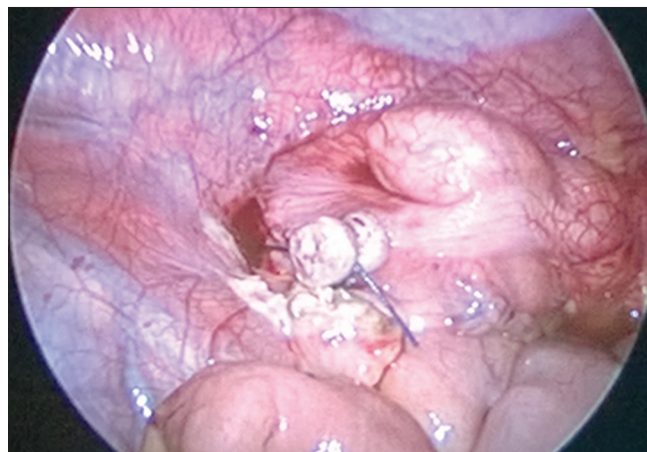


Figure 5: Doubly ligated stump after appendectomy



Figure 6: Immediately after wound closure. Note stab wound in right flank



Figure 7: Cosmetic appearance on POD 8. Scar of stab incision in R flank is hardly noticeable

Table 1: Summary of Results

Parameters	Mean
Age	20.4 years (10-33)
Gender	
Female	24
Male	27
Acute appendicitis	14 patients
Chronic appendicitis	37 patients
Operative time	29.56 min (15-51)
Length of stay	1.71 days (1-4)
Conversion to open	Nil
Conversion to conventional laparoscopy	One
Complications	Seroma-1 discharge 1

No major complications were encountered. One patient had a seroma at incision site which settled with conservative management. One patient had slight sero-purulent discharge from the wound, which was managed with antibiotics (Table 1).

## DISCUSSION

Understanding of pathophysiology of appendicitis and its management has come a long way since Claudius Amyand performed the first appendectomy in 1736.<sup>5</sup> In 1889, McBurney favored early operative intervention and also devised the muscle splitting incision.<sup>6</sup> In 1983, Semm described the first laparoscopic appendectomy. Now, laparoscopic appendectomy has become commonly available and surgeons are moving toward scarless natural orifice surgery. SILA with minimal scarring is a stepping stone toward the scarless procedure.

Multiple techniques have been described for SILA. There have been descriptions of procedures in which special ports have been used.<sup>7</sup> While there are reports in which special curved instruments along with special ports have been used to perform SILA.<sup>8</sup> Some surgeons have used indigenously modified ports as well.<sup>9</sup> Presently there is no standardized technique for performing SILA.

In most of the described techniques, a transumbilical incision is made and a larger fascial incision is made to place the special port. This larger fascial incision is considered to increase the risk for future hernia.<sup>8,9</sup> Also multiple small 5-10 mm incisions are considered to be less traumatic.<sup>9</sup> In some techniques of SILA (SILA Assisted) another fine instrument placed from another site has been used for retraction. It has been noted that complications are lesser in SILA assisted than in SILA.<sup>9</sup> Also there is increased possibility of wound infection as the specimen comes in contact with the wound.<sup>9</sup>

In order to overcome these shortfalls, we have described this new technique. In this technique, no new expensive single use instruments are needed. We have used existing conventional instruments, thus decreasing the cost. In our technique, there is no need for larger fascial incision or the need to dilate the port. The addition of a fine 2 mm grasper/suture passer significantly improves handling of the appendix as well as decreases sword fighting of instruments within the abdomen. The small stab incision does not need to be sutured and gives a very satisfactory cosmetic appearance. As the specimen is retrieved through the 10 mm port; contamination of the wound with the specimen is avoided. To minimize the possibility of a

port site hernia, both 5 and 10 mm fascial openings in the abdomen are closed with No 1 Vicryl.

In SILA, it requires greater degree of skill and coordination. It is a challenging procedure because of crowding of instruments, narrow field of view, and difficulty in retraction. There is a danger of electrosurgical complications as well. In our study, the procedures have been performed by an experienced surgeon, an additional fine assisting instrument is used to aid retraction, and bipolar energy has been used to avoid electrosurgical complications. By adding a fine 2 mm grasper does not change the end cosmetic result, but helps to reduce operative time, increase safety, and surgeon comfort (Figures 6 and 7).

In our study, there were no major complications and a minor wound infection was seen in only one patient. Our results are quite comparable to the meta-analysis done by Rehman and Ahmed of various SILA techniques.<sup>9</sup>

## CONCLUSION

Presently improved cosmesis and reduced scar are the distinct advantage of SILA. However, the results should be reproducible with other operators as well. There should be clear demonstration of decreased morbidity with safety for widespread acceptance and recommendation for which further study is needed.

## ACKNOWLEDGMENT

We would like to thank our patients for their unwavering faith in us; our staff for their dedication and our colleagues for healthy criticism and appreciation, without which nothing is possible.

## REFERENCES

1. Brunt LM, Soper NJ. Laparoscopic surgery. In: Zinner MJ, Schwartz SI, Ellis H, editors. *Maingot's Abdominal Operations*. 10<sup>th</sup> ed. Singapore: McGraw-Hill; 2001. p. 239-85.
2. Pier A, Gotz F, Bacher C. Laparoscopic appendectomy in 625 cases: From innovation to routine. *Surg Laparosc Endosc* 1991;1:8-13.
3. Attwood SE, Hill AD, Murphy PG, Thornton J, Stephens RB. A prospective randomized trial of laparoscopic versus open appendectomy. *Surgery* 1992;112:497-501.
4. Reiertsen O, Rosseland AR, Hoivik B, Solheim K. Laparoscopy in patients admitted for acute abdominal pain. *Acta Chir Scand* 1985;151:521-4.
5. Ellis H, Nathanson LK. Appendix and appendectomy. In: Zinner MJ, Schwartz SI, Ellis H, editors. *Maingot's Abdominal Operations*. 10<sup>th</sup> ed. Singapore: McGraw-Hill; 2001. p. 1191-227.
6. McBurney C. Experience with early operative interference in cases of disease of vermiform appendix. *N Y Med J* 1889;50:676-84.
7. Vidal O, Ginestà C, Valentini M, Martí J, Benarroch G, García-Valdecasas JC.

- Suprapubic single-incision laparoscopic appendectomy: A nonvisible-scar surgical option. *Surg Endosc* 2011;25:1019-23.
8. Kõssi J, Luostarinen M. Initial experience of the feasibility of single-incision laparoscopic appendectomy in different clinical conditions. *Diagn Ther Endosc* 2010;2010:240260.
9. Rehman H, Ahmed I. Technical approaches to single port/incision laparoscopic appendectomy: A literature review. *Ann R Coll Surg Engl* 2011;93:508-13.

**How to cite this article:** Momin ER, Shukla K, Kamat MM, Gosavi M, Kumar S, Upadhye A. Feasibility of Single Incision Laparoscopic Appendectomy with Conventional Instruments. *Int J Sci Stud* 2016;4(5):29-33.

**Source of Support:** Nil, **Conflict of Interest:** None declared.