Two Ports versus Three Port Laparoscopic Appendicectomy- A Step Further Towards Minimal Invasiveness

Pinakin K. Sutariya¹, Jagdish B. Chavda²

¹²Assistant Professor, Department of Surgery, GMERS Medical College, Sola, Gujarat, India

ABSTRACT
BACKGROUND: Minimal access surgery is the preferred mode of treatment in current era. In present study we have tried to minimize the minimal access by omitting one port for laparoscopic appendicectomy and to compare the two port and three port laparoscopic appendicectomy in terms of safety, efficacy, duration of surgery, preoperative as well as postoperative complications and hospital stay. MATERIALS AND METHODS: This prospective and randomized study is conducted at GMERS medical college, Sola, Ahmedabad, and Gujarat from June-13 to December-14. A total of 175 patients were included in the study, who underwent two port and three port laparoscopic appendicectomy randomly with a ratio of 1:2. RESULTS: In our study, mean operative duration for three port appendicectomy was 46 min. and for two port technique, it was 40 min. Wound infection rate was 3.39% and 3.50% in three port and two port method respectively. Average hospital stay was 2.3 days in three port and 2.1 days in two port appendicectomy method. CONCLUSION: Two port laparoscopic appendicectomy method carries all the advantages of standard three port technique. Duration of surgery, complication rate and hospital stay were also comparable in both the techniques. In early onset and non complicated cases of appendicitis, two port appendicectomy is a safe and effective alternative to standard three port technique.

Key words: Two port, Laparoscopic appendicectomy, Needle loop.

INTRODUCTION
Today laparoscopic appendicectomy has become the treatment of choice for acute appendicitis as it has several advantages like less invasive, complete intraperitoneal view, less postoperative pain, early mobilization, short hospital stay, early resumption of work and better cosmesis.¹²
Laparoscopic appendicectomy has proved its efficacy in pediatric patients³⁴⁵ and is found to be safe even in the hands of trainee surgeons.⁶ As this is the era of minimal access surgery, attempts are continuously being made to make it even lesser invasive and better cosmetically. Minilaparoscopy and laparoendoscopic single site surgery (LESS) procedures like SILS and NOTES are the results of these attempts. These techniques require specialized instruments and trained persons. They have their own complications and they are costly and till date not universally accepted as standard methods. In our study, we have tried to improve the cosmetic result by making some modification in currently established standard three port laparoscopic appendicectomy (SLA) method. We have adopted a two port laparoscopic appendicectomy (TLA) technique by omission of RHC/RIF port, which gives better cosmetic result as the only visible port is omitted. This procedure can be done with routine instruments and it does not require special training.

MATERIALS AND METHODS
This prospective randomized study was conducted at GMERS medical college, Sola, Ahmedabad, Gujarat from June-13 to December-14. Total 175 patients who underwent laparoscopic appendicectomy were included in the study after informed written consent. Patients with early onset, non complicated appendicitis were included in the study, where phlegmon, appendicular abscess, perforated appendix, adhesions, generalized peritonitis were considered as complications and were excluded from the study. Patients were divided into two groups. Patients with SLA were known as group-1 and those with TLA as group-2.
Diagnosis was made on the basis of clinical examination, complete blood count and ultrasonogram. After proper fluid
management and antibiotic prophylaxis, patients were subjected to SLA and TLA randomly in the ratio of 2:1.

Operative technique: Three port lap. appendicectomy was performed with 10mm infraumbilical, 5mm suprapubic and 5mm RIF/RHC port with intracorporeal knotting to tie the base of the appendix.

In two port technique, 10mm infraumbilical camera port and 5mm suprapubic working port were made. Peritoneal cavity was inspected. If adhesions were found or the appendix was retroperitoneal or subserous in position, third 5mm RHC/RIF port was put and proceeded as SLA. In rest of the cases, suture loop was inserted through a 20 gauge hypodermic needle at RHC/RIF according to the case. One end of a polypropelene 2-0 was passed through the hub of the needle, recovered from the tip and held with the other end of the suture. Now the needle was pierced through the anterior abdominal wall at RIF/RHC. With the help of the working instrument, loop is made bigger inside the abdomen by pulling one end of the suture. Appendix is passed through the loop and pulled upwards. Needle is now removed and both the ends of suture loop are held with an artery forceps flush to the abdominal wall. Dissection of the mesoappendix was done with electrocautery. A suture was passed through the working port, around the appendix and taken back out for extracorporeal knot to tie the base of the appendix and specimen was removed.

RESULTS

Table: 1 Demographic comparison

<table>
<thead>
<tr>
<th></th>
<th>Group-1 (n=118)</th>
<th>Group-2 (n=57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>26 (13-69)</td>
<td>25 (15-68)</td>
</tr>
<tr>
<td>Sex</td>
<td>Male to female ratio</td>
<td>3.2:2</td>
</tr>
</tbody>
</table>

Table: 2 Procedure out come

<table>
<thead>
<tr>
<th></th>
<th>Group-1 (n=118)</th>
<th>Group-2 (n=57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of surgery(min.)</td>
<td>46</td>
<td>40</td>
</tr>
<tr>
<td>Wound infection</td>
<td>4(3.39%)</td>
<td>2(3.50%)</td>
</tr>
<tr>
<td>Hospital stay(days)</td>
<td>2.3</td>
<td>2.1</td>
</tr>
</tbody>
</table>

During our study, total 175 patients were operated for laparoscopic appendicectomy. Out of these, 118 patients were included in SLA (group-1) and 57 patients were included in TLA (group-2).

In group-1, age range of patients was from 13 years to 69 years, the mean age being 26 years. Whereas in group-2, patients of age 15 years to 68 years were included and the mean age was 25 years. Male to female ratio in group-1 was 3.2:2 and that in group-2 was 3.1:2 (Table-1).

Mean duration of surgery in group-1 was 46 min. (25-50min.) and that in group-2 was 40min. (22-55min.). Peroperative as well as postoperative complication rate and length of hospital stay were comparable in both the groups (Table-2).

DISCUSSION

Appendicectomy is probably the most common surgery performed in surgical practice. Laparoscopic appendicectomy has proven its edge over open procedure for better cosmesis, lesser pain and shorter hospital stay. SILS, NOTES and minilaparoscopy have been attempted to make the procedure even lesser invasive. But LESS procedures require special operation theatre setup and training, adding to its cost. 7 Technical difficulties as compromised triangulation and restricted working space are the other limiting factors for these procedures to get established as mainstream routine methods. 8,9 Recent study has shown that SILS appendicectomy is associated with more postoperative pain and longer operative time without any improvement in complication rate. 10 In minilaparoscopy, 2-3mm ports are used. But scar of these smaller ports is also visible. Study suggest that it is associated with longer operative time and higher conversion rate to open surgery. 11

In our study, we have attempted two port Lap. Appendicectomy technique. Surgeons participating in the study were well acquainted with SLA, which ensures the safety of the patients. This is an intermediary step between SLA and LESS procedures. This can be performed with routine laparoscopy instruments and does not require special training. It provides better triangulation and working space as compared to SILS.

In TLA, two ports were made and the third RHC/RIF port was replaced by a suture.
loop passed through a 20-gauge hypodermic needle. Because of omission of this third port, there was no pain or scar mark at RHC/RIF. The other two ports were so placed, that they were naturally hidden making it a potentially scarless surgery. We used 20-gauge needle for insertion of suture loop instead of 14-gauge intravenous catheter used by Leandro Totti Cavazzola et al. This resulted in considerably less pain and better satisfaction to the patients. The entry site of suture loop was decided according to the position of the appendix to have maximum maneuverability and countertraction. In case of long mesoappendix, the appendix has to be repositioned in the loop for complete dissection. When the mesoappendix was short and thick, it was difficult to bring the appendix to the abdominal wall. This might be a shortcoming of the procedure. Other methods for loop formation, like, endoloop and puppeteer technique have been described by the authors. Ours is a very simple and effective method for creating a loop without adding to the cost of the surgery unlike the endoloop method. Ahmed Khairi et al. described a two port lap. appendicectomy technique, where the appendix was delivered out through the working port and the rest of the surgery was completed extracorporeally. As the inflamed appendix comes into contact with the skin, there is a potential risk of infection. In our study, we completed the procedure intracorporeally eliminating the probable risk of port site infection. Mean operative time in group-1 was 46 min.(25-50min.) and that for group-2 was 40 min.(22-55min.). This is in contrast to the study done by Panait L et al. where two port technique took little longer time(64.1min.). This might be due to the fact that they were in the initial phase of their learning curve of the technique. As only non complicated cases were selected for both the groups, there should not be any major difference in operative time, except the time taken for creation and closure of the third port in group-1. Wound infection was found in 4(3.39%) patients of group-1 and in 2(3.50%) patients of group-2, which is quite comparable. All these patients recovered well with oral antibiotic. No other complications like, intraoperative bleeding or intra-abdominal abscess were found in either group. Which might be due to selection of clean, uncomplicated cases. Patients were discharged on second postoperative day. Mean duration of hospital stay for group-1 was 2.3 days and for group-2, it was 2.1 days. This coincides with the study done by Fazili FM et al. Hospital stay as short as 1 day or even less is reported in study by Panait L et al. Shorter stay in two port appendicectomy might be due to lesser post operative pain to the patients.

**CONCLUSION**

Technically, Two port laparoscopic appendicectomy is almost same as standard three port laparoscopic appendicectomy, carrying all its advantages. Besides, it is more economical as only two ports are used saving the cost of the third one and use of routine sutures for loop formation and base ligation saves the cost of endoloop and endostapler. TLA is associated with lesser pain and better cosmesis. The results of operative time, complications and hospital stay are comparable in both the groups. So in non complicated cases of appendicitis, TLA is as effective and safe as SLA if not superior.

**REFERENCES**


2. Xiaohang Li, Jialin Zhang, Lixuan Sang Laparoscopic versus conventional appendectomy - a meta-analysis of randomized controlled trials BMC Gastroenterology 2010, 10:129 (3 November 2010)

Two Ports versus Three Port Laparoscopic Appendicectomy


20. R S Brooks, MD RVT. Two-port Laparoscopic Appendectomy: Maximally Versatile Minimally Invasive Surgery, SAGES.