



2 PORT VS 3 PORT LAPAROSCOPIC APPENDICECTOMY IN UNCOMPLICATED APPENDICITIS - MINIMISING THE MINIMALLY INVASIVE.

General Surgery

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ABSTRACT

Introduction: The conventional three-port technique for laparoscopic appendicectomy has proven its worth in the management of appendicular pathologies. From a cosmetic viewpoint, the umbilical and suprapubic port-sites are hidden by natural camouflages, the right Iliac fossa (RIF) port is the only visible external sign of surgery. The two-port technique avoids even this marker of abdominal invasion. In this study, we describe the technique of two-port laparoscopic appendicectomy (TPLA) and compare it with conventional laparoscopic appendicectomy (CLA). **Materials & Methods:** All patients studied underwent operation for acute appendicitis in the department of General Surgery at Dr B R Ambedkar Medical College and Hospital Bengaluru from Jan 2022 to Jan 2023. A total 80 patients were included in the study and the data were collected prospectively for TPLA and CLA. The TPLA was performed with one 10 mm umbilical camera port and one 5 mm LIF working port. A cobbler needle was introduced in the RIF to retract the appendix. The appendicular artery was controlled with diathermy. The base was ligated with an endoloop. CLA was performed via the conventional 10 mm umbilical, 5 mm suprapubic and 5 mm LIF ports. The appendicular stump was ligated with an endoloop or an intracorporeal knot. **Results:** Of the total 80 patients 40 patients underwent TPLA and the other 40 patients underwent CLA. Of the 40 TPLA 5 patients underwent conversion to CLA. The, Cosmetic outcomes and complications were comparable in both the groups. Hospital stay was shorter in TPLA (statistically significant) where as the operative time was more (statistically significant) in TPLA when compared to the CLA group. Of the 40 TPLA, 5 cases underwent conversion to CLA and there was no conversion from CLA to open. **Conclusion:** This is an initial experience with TPLA. We believe that this is a safe and feasible procedure, which while being cosmetically acceptable has an economic advantage and acts as an ideal bridge before SILS appendicectomy or even NOTES appendicectomy become standardized, affordable and widely accepted. There is hence little to be lost and a likely benefit to be gained by performing the TPLA although a randomised study with large sample size is necessary.

KEYWORDS

Appendicitis, Appendicectomy, laparoscopic appendicectomy, two port appendicectomy, conventional 3 port appendicectomy.

INTRODUCTION

Acute appendicitis is the most common cause of an 'acute abdomen' in young adults and, is the most frequently performed urgent abdominal operation. The traditional treatment for acute appendicitis is appendicectomy, which can be performed by open or laparoscopic technique and when the appropriate equipment and expertise are available laparoscopic appendicectomy is more advantageous, because of decreased pain, fewer postoperative complications, shorter hospitalization, earlier mobilization, earlier return to work, and better cosmesis^[1-3]. In laparoscopic appendicectomy the conventional 3 port technique (CLA) has proven its benefits in the management of appendicular pathologies. We now see if the same benefit can be derived by using a 2 port technique (TPLA), especially from cosmetic point of view as right iliac fossa port is the only visible sign of external surgery, since the suprapubic and the umbilical scars get hidden by the natural camouflages. The port in RIF is mainly used to hold and give traction to the appendix. Various devices have been used for this such as, minialligator, needle port, pretied loop, veress needle assisted, cobbler needle etc. The two-port technique avoids even this marker of abdominal invasion without altering the safety profile. Hence in this study, we describe the technique of two-port laparoscopic (TPLA) compared to conventional laparoscopic appendicectomy (CLA) in uncomplicated appendicitis.

MATERIALS & METHODS

Following an approval from the ethics committee, the consented patients, with an age group range of >10 year < 65 year, ASA < 2, admitted in the department of General Surgery at Dr B R Ambedkar medical college and hospital (Dr. B R AMCH) Bengaluru, with a diagnosis of uncomplicated appendicitis (based on clinical, biochemical, radiological and diagnostic scopy) during the period of July 2022 to May 2023, were considered in the study.

Those patients who did not give consent, age <10 - >65 years, ASA >2, Adnexal pathology, generalised peritonitis, appendicular perforation /

gangrene, appendicular abscess, appendicular mass, retrocaecal appendix, meckels diverticulum, pregnancy, previous lower abdominal surgery, TB abdomen, inflammatory bowel disease were not considered in the study. A total of 80 sample size was derived for the study. The data were collected prospectively from July 2022 to may 2023 for both the groups and clinical outcomes of 2 procedures were compared.

Statistical analysis was performed using Chi square test and Student's t-test for analysis and P value of less than 0.05 was considered as statistically significant difference between groups. SPSS software was used to analyse the data.

OPERATIVE TECHNIQUE

Under GA and aseptic measures, pneumoperitoneum (12mmHg) was created using a open Hasson's technique through the umbilicus. Following this a 10 mm camera was inserted into the umbilical port and diagnostic scopy performed. 5 mm trocar was then inserted through a suprapubic incision under vision through which a bowel grasper was introduced to identify the appendix. (head low and left tilt position for better access and visualization of appendix) After a thorough exploration of the peritoneal cavity, and with the confirmation of uncomplicated appendicitis the cobbler needle is inserted in the RIF to hold and give traction to the appendix. [Fig - 1].

Through the 5mm working trocar the appendicular artery was controlled and the mesoappendix transected with shearing bipolar or Maryland with monopolar. [Fig - 2] The base of the appendix was then ligated using a pretied endoloop passed through the 5mm working port [Fig - 3]. Finally the appendix was then resected and delivered via the umbilical port using a laparoscopic extractor (Fig - 4) and endobag in majority of the cases with a 5 mm camera inserted in the working port. The CLA was performed in a similar fashion apart from the use of a 5 mm port in the RIF instead of the cobbler needle. The 10 mm port was closed with port closure and the 5 mm with a 3.0 ethilon. [Fig - 5]



Fig-1 – Port placements



Fig-2 – Division of mesoappendix



Fig-3 – Endoloop application to base of appendix



Fig-4 – Extraction of appendix



Fig-5 Immediate Post OP.

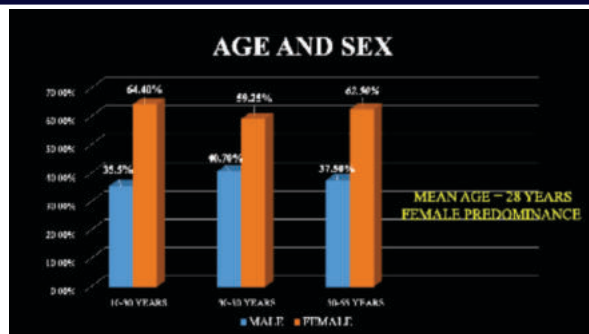
RESULTS

We had a total 80 cases in the study group where 40 cases were subjected to 2 port laparoscopic appendicectomy (**Group A**) and the other 40 patients were subjected to 3 port Conventional laparoscopic appendicectomy (**Group B**).

Out of 40 patients in TPLA 5 patients were converted to CLA.

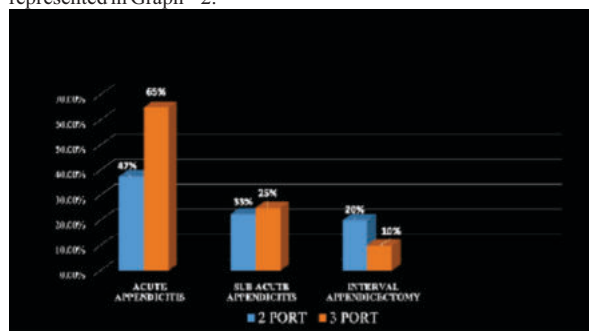
The demographic details of the study group were noted as mentioned in the Graph - 1.

There was a mean age group of 28 years with female preponderance.



Graph – 1 – Demographics.

Majority of the cases in the study were of acute appendicitis, followed by subacute appendicitis and around 30 percent of the total cases were for interval appendicectomy who were subjected to TPLA and CLA as represented in Graph – 2.



Graph – 2 – Presentation Of Appendix And The Sectorization To TPLA & CLA

In our study, a statistically significant difference was noted among the operative times and the duration of hospital stay. The operative time was longer in TPLA when compared to that of CLA. Where as the duration of hospital stay was much shorter in TPLA when compared to CLA. [Table – 1]

Post operative pain was analysed using VAS at POD 6, 12 , & 24 hrs and that it was not statistically significant among the 2 groups.

From the cosmetic point, the mean patients satisfaction score was 2.8 for TPLA and 3.1 for CLA which was comparable to the reported literature, but there was no statistically significant difference among the 2 groups. [Table -1]

As an intra operative complication, there was one case of transection of appendix, one case of serosal tear and 2 cases of bleeding from mesoappendix in TPLA for which 4 cases underwent conversion to CLA, but none underwent conversion from CLA to open.

One case of port site infection in CLA was noted as post operative complications and nil complications in TPLA, although it was not statistically significant. [Table -1]

Table – 1- Comparison Between TPLA & CLA

PARAMETERS TOTAL = 80	2 PORT (TPLA) N=40	3 PORT (CLA) N=40	P VALUE
Mean duration of operation	45 min (40 ± 15 min)	32 min (32 ± 10 min)	P<0.05
Post operative pain (VAS at 24 hours)	1.8	1.6	Not significant
Duration of hospital stay (Days)	1.2 ± 1.5 (1.2 ± 0.7)	3.4 ± 2.1 (1.4 ± 0.6)	P<0.05
Cosmesis (Mean Patient satisfaction score)	2.5	3.1	Not significant
Post operative complications	0	1 (0.4%)	

DISCUSSION

Herbert Fitz was the first to person to publish the need for early diagnosis and surgery for acute appendicitis.^[4] Kurt Semm introduced laparoscopic surgery for appendectomy,^[5] Routinely, laparoscopic

appendectomy is performed using three-ports which is the conventional method, but in our study we have used only 2 ports to perform laparoscopic appendectomy using a cobbler needle to hold and give traction to appendix, in an uncomplicated appendicitis. In CLA, the use of 5–10 mm ports in the umbilical and RIF, right hypochondrial or left iliac fossa regions often leave clearly visible scars. We TPLA using a cobbler needle to replace the RIF trocar and the 5mm suprapubic trocar placed in the hairline of the suprapubic region has shown to be a safe and feasible option in uncomplicated appendicitis. It also enables a good degree of manipulation and traction of appendix. But at times when there is severe inflammation and a dilated appendix there can be a possibility of serosal tear or perforation of appendix, which was noted in our study, although not statistically significant. Even though it is mentioned that the placement of cobbler needle is in RIF, one can be flexible in this placement and can take a call after locating the appendix intra operatively so that it ergonomically and cosmetically suits the patient.

In our study we had a mean operative time of 45 mins which was more than the CLA. This could probably be due to the learning curve which has a possibility of improving over a period of time. A statistically significant mean duration of hospital stay was noted in the TPLA group, which compared favourably with other studies.^[6-8]

Multiple attempts have been made to reduce incision morbidity and improve cosmetic outcomes in laparoscopic appendectomy by using fewer and smaller ports^[6-11] Kollmar *et al.* described moving laparoscopic incisions to hide them in the natural camouflages like the suprapubic hairline and improve cosmesis^[12]

Additionally, reports in the literature indicate that mini-laparoscopic appendectomies using 2–3 mm or even smaller instruments along with one 12-mm port minimizes pain and improve cosmesis.^[9,13,14] More recently, studies by Ates *et al.* and Roberts *et al.* have described variants of an intracorporeal sling based single-port laparoscopic appendectomy with good clinical results.^[15,16]

Trend towards single incision laparoscopic surgery is increasing now a days and can be easily converted to conventional laparoscopy in case of emergency by adding a few trocars, this conversion to conventional laparoscopy being called port “rescue”.^[17]

However SILS is still evolving due to its steep learning curve, decreased exposure and added financial burden requiring special articulating and coaxial instruments which limits its use.

So the two-port laparoscopic appendectomy can be used in training programs to meet the necessary skills.

CONCLUSION

This is an initial experience with TPLA. We believe that this is a safe and feasible procedure, which while being cosmetically acceptable has an economic advantage and acts as an ideal bridge before SILS appendectomy or even NOTES appendectomy become standardized, affordable and widely accepted. Also no major complications were found in this procedure and can be converted to three port in emergency. There is hence little to be lost and a likely benefit to be gained by performing the TPA, although a randomised study with large sample size is necessary.

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