

# Two-port laparoscopic appendectomy

Mohamed Lotfy, Mostafa M. Khairy, Mohamed S. Moussa

## ABSTRACT

**Aims:** In this study, we aimed at evaluating the feasibility of using only two ports to perform laparoscopic appendectomy for selected cases of acute appendicitis. **Methods:** Thirty-four patients were diagnosed to have acute appendicitis. diagnostic laparoscopy was done to confirm the diagnosis and to assess the feasibility of the two-port technique. A yellow spinal needle was inserted in the right iliac fossa and its tip was fashioned like a hook and anchored the appendix. Then the needle was fixed on the abdominal wall by an artery forceps. The appendix was skeletonized by the monopolar diathermy and the base was controlled by an extracorporeal knots and the appendix was removed. **Results:** Thirty-four patients were operated by the two-port technique. The mean age of our patients was 24.7 years and ranged 17–33 years and the female: male ratio was 10:7. The mean operative time was 56.3 minutes and ranged 42–75 minutes. The mean hospital stay was 1.2 days and ranged 1–3 days. Only one patient had postoperative ileus which was resolved by conservative management within two days. There was only one patient who developed port site wound infection at the left iliac fossa wound four days after discharge. **Conclusion:** Performing laparoscopic appendectomy with

only two ports is almost reasonably priced, it is safe in selected patients, can be simply taught, and it is applicable in hospitals that lack the highly developed laparoscopic tools. It is also considered as a transitional step between the conventional laparoscopy and the single site laparoscopy.

**Keywords:** Appendectomy, Laparoscopic, Spinal needle, Two-port

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## INTRODUCTION

Acute inflammation of the appendix is one of the most common intra-abdominal surgical disorders. It requires a complete understanding of its management, including assessment, diagnosis, and overall operative intervention. The operative approach to acute appendicitis is appendectomy [1–3]. The first laparoscopic appendectomy was performed by Kurt Semm, a German gynecologist, in 1980 [4, 5]. However, the preference between an open approach and a laparoscopic approach is still debated among surgeons [1–3].

Larson et al. [6] gracefully defined numerous reasons why a laparoscopic procedure seems to be superior to the

Mohamed Lotfy<sup>1</sup>, Mostafa M. Khairy<sup>1</sup>, Mohamed S. Moussa<sup>1</sup>  
**Affiliation:** <sup>1</sup>MD, Department of Surgery, Faculty of Medicine, Zagazig University, Egypt.

**Corresponding Author:** Mohamed Lotfy, Department of Surgery, Faculty of Medicine, Zagazig University, Egypt; Email: lotfymira@yahoo.com

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conventional open appendectomy: better visualization and magnification, exploration of all surrounding viscera, better handling in obese patients, minimal tissue trauma and reduced the incidence of surgical site infection [7].

Although laparoscopy gives the patient and the surgeon great advantages, there are ongoing efforts to reduce the resultant trauma and to increase the aesthetic results by decreasing the size and number of cuts created for the ports. Mini-laparoscopy appears to be an option to achieve this by using portals located as usual but with using instruments of smaller diameter [8]. Also a group of procedures known as laparoendoscopic single site surgery [9, 10] (including single-incision laparoscopic surgery [11, 12] and the use of single-port laparoscopy [13, 14]) came into the surgeons concern. In this study, we aimed at evaluating the feasibility of using only two ports to perform laparoscopic appendectomy for selected cases of acute appendicitis.

## MATERIALS AND METHODS

This study was carried out in Zagazig University hospitals at the emergency department during the period from October 2016 to February 2017. Thirty-four patients were diagnosed by history, clinical examination and laboratory investigations to have acute appendicitis. Laparoscopic approach was primarily offered, in addition to the option of open surgery conversion and a written informed consent was taken. The surgeons performing the operations in this study are accustomed to perform the usual laparoscopic appendectomy and are competent in this field of surgical practice. Patients were prepared as in the conventional technique. Patients had to urinate before the operation. Patients were put in Trendelenburg position during the procedure after inserting the operating trocars with the operating table was tilted slightly to the left side. The surgeon and his assistant were on the left side of the patient. Insufflation of the abdomen by CO<sub>2</sub> was done to reach 12 mmHg then 10 mm port was inserted in the umbilicus and diagnostic laparoscopy was done by using 30° telescope to confirm the diagnosis and to assess the feasibility of the two-port technique. Then another 10 mm port was inserted at the left iliac fossa for assessment of the mobility of the appendix and the cecum and to exclude diffuse peritonitis which might hinder the two-port technique. If the appendix was retrocecal subserous and the cecum was immobile or in case of generalized peritonitis, a third 5 mm port was inserted in the suprapubic region and the case was completed as the usual laparoscopic appendectomy and the case was excluded from the study. Then a yellow spinal needle was inserted in the right iliac fossa and its tip was fashioned like a hook with the help of the laparoscopic needle holder and manipulated to anchor the seromuscular layer of the inflamed appendix without puncturing it (Figures 1 and 2). Then the needle was pulled up with the anchored appendix and fixed on the abdominal wall

by an artery forceps fixing the appendix and exposing the mesoappendix (Figure 3). The mesoappendix was dissected using the laparoscopic hook near its attachment to the appendiceal wall. Control of the base was done by passing 2/0 long vicryl thread via the working port and passed around the anchored appendix and withdrawn outside the abdomen through the working port and an extracorporeal knot was fashioned and pushed by a knot pusher to settle at the appendicular base then two titanium clips were put above the knot and the appendix were cut between them and removed inside a latex glove finger which was fashioned to form a retrieval bag. Lastly, the spinal needle was removed after restraightening it and the two ports were removed and the two wounds were closed.

## RESULTS

From October 2016 to February 2017, thirty-four patients with acute appendicitis were managed by the two-port technique of laparoscopic appendectomy. The mean age of our patients was 24.7 years and ranged 17–33 years and the female:male ratio was 10:7. The mean operative time was 56.3 minutes and ranged 42–75 minutes. The mean length of hospital stay was 1.2 days and ranged



Figure 1: Anchoring the appendix with the spinal needle.

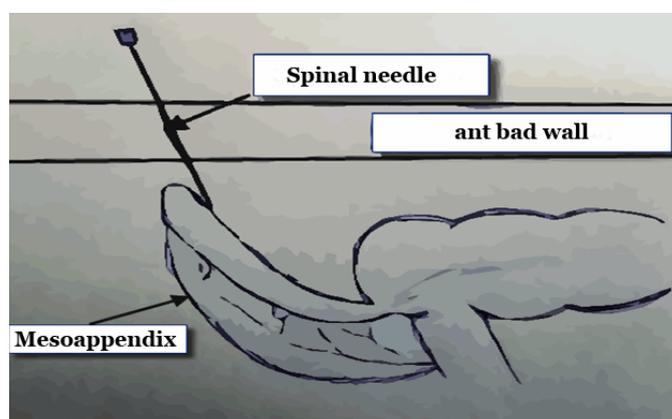


Figure 2: A graph showing the spinal needle anchoring the seromuscular layer of the appendix.



Figure 3: The spinal needle fixed on the abdominal wall by an artery forceps.

1–3 days. Only one patient developed postoperative ileus which was resolved by conservative management within two days and the patient was sent home after three days of admission. There was only one patient who developed a port-site wound infection at the left iliac fossa wound four days after discharge, the wound was opened and drained and culture and sensitivity was done and revealed a gram negative bacilli which were ciprofloxacin sensitive and the infection resolved within 12 days of daily dressing. We did not use endo-loop nor retrieval bag and we use only two-port technique instead of three which in turn, was an economic modality of performing this common operation.

## DISCUSSION

In 19th century, the first description of open appendectomy was done by Fitz. The removal of the appendix is the safest treatment in all stages of the inflamed appendix [15] but traditional open appendectomy always results in a disfiguring scar. Acute appendicitis, being a disease affecting mainly the young people, so the cosmetic outcome of the operation should be greatly considered [12, 16].

In the laparoscopic era, those patients were offered more cosmetic gains as compared to the open technique. Then the need for decreasing the number of the small scars of the three-port laparoscopic approach made the surgeons and medical engineering companies search for modulations of the conventional laparoscopy to get better cosmetic results for the patients. This led to laparoendoscopic single site surgery era [9, 10] followed by the scarless surgery (NOTES) era.

The two-port procedure for treating acute appendicitis can be considered as a transitional step between the conventional laparoscopic appendectomy and the single site laparoscopic technique.

In our study, we used the spinal needle as it is long enough to reach the peritoneal cavity and it can easily be bent with the needle holder. Also it can be passed easily through the seromuscular layer of the appendix in selected cases. The hanging of the seromuscular layer of the appendix gave us a good space to free it from the mesoappendix facilitating its removal through the port. In a previous study, they used a ligature to hang the appendix from the mesoappendix [17, 18].

We preferred using the laparoscopic hook during dissection of the mesoappendix as it is a cheap energy source and it was very useful during skeletonization of the appendix. In other studies, they used bipolar forceps, endoclips, harmonic scalpel or vascular stapler [19, 20] which constituted an economic burden on the patients.

In this study, we used a specially fashioned a finger of sterilized latex glove instead of the retrieval bag making this procedure more economic than other techniques in other studies [19, 20].

The mean operative time was 56.3 minutes and ranged 42–75 minutes which is considered slightly less than 64.5 minutes in a similar study with a different handling as related to the method of hanging of the appendix [21].

Safety of the patients was our priority during carrying out this study that is why we applied this technique to selected patients to give them the benefit of omitting one port with its all possible complications, either during insertion or the postoperative pain, without putting them at risk of iatrogenic morbidities.

## CONCLUSION

In conclusion, performing laparoscopic appendectomy with only two-port procedure is almost reasonably priced, it is safe in selected patients, can be simply taught, and it is applicable in hospitals that lack the highly developed laparoscopic tools. It is also considered as a transitional step between the conventional laparoscopy and the single site laparoscopy.

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### Author Contributions

Mohamed Lotfy – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Mostafa M. Khairy – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Mohamed S. Moussa – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

### Guarantor

The corresponding author is the guarantor of submission.

### Conflict of Interest

Authors declare no conflict of interest.

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