

Laparoscopic Treatment of Perforated Appendicitis

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ABSTRACT

The most frequent general surgical emergency worldwide is acute appendicitis. Because to its potentially fatal complications, including perforation, it could put patients at danger of death. An appendix that has ruptured frequently results in serious infectious complications as abdominal sepsis, pelvic abscess, and others. Laparoscopic appendectomy for perforated appendicitis raises several questions. In many nations today, laparoscopic treatment of perforated appendicitis is the preferred surgical technique.

Aim: This prospective study's objective was to assess the efficacy of laparoscopy in the treatment of complicated appendicitis (perforation).

Methods: The study was conducted prospectively during the period from September 2020 to August 2022. The study included 50 individuals who underwent peritoneal lavage after laparoscopic appendectomy of perforated appendix in the department of Surgery, Lady Reading Hospital, Peshawar. The traditional method, three ports technique was used. Sometimes a fourth port is needed. Telescopic ports are 10 mm in size. The other two ports are 3/5 mm and 5/10 mm, respectively. Unipolar diathermy is a source of energy. Hemostasis and ligation of the appendicular stump are achieved via intra-corporeal knotting, endo-loop, and hemo-clip.

Results: The study's age range is 5-70 years, with a mean age of 19 with male predominance. The duration of surgery varies from 30 to 120 minutes, with a mean duration of 65 minutes. Hospital stays range from 48 to 96 hours on average. There were 12 patients with complications, including paralytic ileus was seen in 1(2%), diarrhea in 2(4%), multiple or single (4% and 8%) port infections, and port TB in (4%). Open conversion was seen in 1 (2%) patient due to appendicitis burst haemorrhage. Every complication was treated carefully.

Conclusion: Laparoscopy is an excellent method for treating perforated appendicitis. Thus, it is practical, achievable and may be carried out by skilled hands in any centre. That is now regarded as regular operating procedure.

Keywords: Laparoscopic appendectomy, Perforation (burst)

INTRODUCTION

Vermiform appendix function in human physiology is not yet fully understood. Since the beginning of medical science, this muscular organ with a blind-tube structure has been well-known to surgeons, mainly because of its propensity to get inflamed¹⁻². It is regarded as the most typical reason for an acute abdomen. Acute appendicitis may result in complications that endanger life. Appendectomy is the communal accomplished emergency abdominal surgical procedure in various regions of the world³⁻⁴. Appendectomy is mostly performed by young surgical residents in major part of the world. The vermiform appendix is a muscular tube with submucosal, serosal and mucosal layers that is attached to the caecum with 7.5-10 cm of average length, and the irregularly shaped lumen is encircled by colonic-type columnar intestinal mucosa and numerous mucous membrane longitudinal folds⁵⁻⁶. The three taenia coli of the caecum meet at the appendix's base, which remains in the same place, but the appendix's tip is variable. It receives its arterial supply from the appendicular artery⁷⁻⁸. The Kulchitsky cells in the appendix's crypts have the potential to develop into carcinoid tumors. The most frequent emergency operation for general surgery is a laparoscopy, which is also performed frequently for acute appendicitis. Due to its potentially fatal complications like rupture (perforation) and abscess, it may put patients at danger. Abdominal sepsis, pelvic abscess, and other significant infection complications are frequently brought on by the ruptured appendicitis⁹. An appendix that has ruptured frequently results in serious infectious complications as abdominal sepsis, pelvic abscess, and others. Laparoscopic appendectomy for perforated appendicitis raises several questions. In many nations today, laparoscopic treatment of perforated appendicitis is the preferred surgical technique¹⁰.

In order to distinguish between the numerous clinical disorders that mimic appendicitis, laparoscopy is a very useful diagnostic tool. The positioning of the ports varies, as it does with other laparoscopic procedures, depending on the surgeon's

preference, level of expertise, and existing abdominal scars. The three-port approach was used¹¹. Telescopic ports are 10 mm in size. The other two ports are 3/5 mm and 5/10 mm, respectively. CO₂ gas is favorable physiologically than O₂ or ambient air, was used to induce pneumoperitoneum¹². The infra-umbilical port is used to implant the camera and create pneumoperitoneum using carbon dioxide, while the left iliac fossa and suprapubic region ports were created under direct vision. On the patient's left, the surgeon is standing. The right side of the operating table is elevated while the patient is retained in the Trendelenburg position to improve exposure¹³. The base of the appendix is identified using taenia coli, which are then grasped with forceps. The appendicular artery is exposed once the meso-appendix has been exhibited and is then clipped or coagulated using hook, scissors or dissecting forceps. Occasionally, mobilizing the caecum (by severing the peritoneal attachments) is necessary to allow for appropriate appendix exposure¹⁴. The appendix is removed through the operating ports once it has been freed from its mesentery and ligation at the base was done with absorbable sutures.

METHODS

The study was conducted prospectively during the period from September 2020 to August 2022. The study included 50 individuals who underwent peritoneal lavage after laparoscopic appendectomy of perforated appendix in the department of Surgery, Lady Reading Hospital, Peshawar. Three ports technique was the traditional method used. Sometimes a fourth port is needed. Telescopic ports are 10 mm in size. The other two ports are 3/5 mm and 5/10 mm, respectively. Unipolar diathermy is a source of energy. Hemostasis and ligation of the appendicular stump are achieved via intra-corporeal knotting, endo-loop, and hemo-clip. The clinical evaluation was done to make the diagnosis, which was supported by certain standard laboratory, imaging, and radiological tests. The most prevalent symptoms included

periumbilical colic, pain transferring to the right iliac fossa, anorexia, nausea and an increase in body temperature. To help with the clinical diagnosis, the following signs were also elicited: the McBurney's sign, pointing sign, rebound tenderness (Release sign), Rovsing's sign, obturator sign and Psoas sign. The urine complete examination, complete blood count (which revealed neutrophilic leukocytosis), abdominal ultrasound (to rule out other appendix condition and other abdominal pathologies), β -hCG (for females of reproductive age) and pregnancy test, and abdominal CT scan (in selected patients) were among the other laboratory and radiological investigations that were carried out. Using the Alvarado (MANTRELS) scoring system, a score of 7 or above strongly showed acute appendicitis, whereas a score of 5 to 6 was seen as equivocal. In suspected patients, the diagnosis was made clinically. Under general anaesthesia, laparoscopic surgery was accomplished. Patients were positioned in the supine position while under general anaesthesia. Three locations were designated for the port's insertion: the supra-umbilicus (10 mm port for inducing pneumoperitoneum and introducing the telescope), the left iliac fossa (avoiding the inferior epigastric artery) and the lower midline above the pubic symphysis (5 mm port).



Fig-1&2: Port markings and ports placement

CO₂ gas is favorable physiologically than O₂ or ambient air, was used to induce pneumoperitoneum. The infra-umbilical port is used to implant the camera and create pneumoperitoneum using carbon dioxide, while the left iliac fossa and suprapubic region ports were created under direct vision. To look for any other anomalies or collections, the abdominal cavity was examined.



Fig-3&4: working placement and Stump control with atraumatic suture

The base of the appendix is identified using taenia coli, which are then grasped with forceps. The appendicular artery is exposed once the meso-appendix has been exhibited and is then clipped or coagulated using hook, scissors or dissecting forceps. Occasionally, mobilizing the caecum (by severing the peritoneal attachments) is necessary to allow for appropriate appendix exposure. The appendix is removed through the operating ports of 10 mm once it has been freed from its mesentery and ligation at the base was done with absorbable sutures.

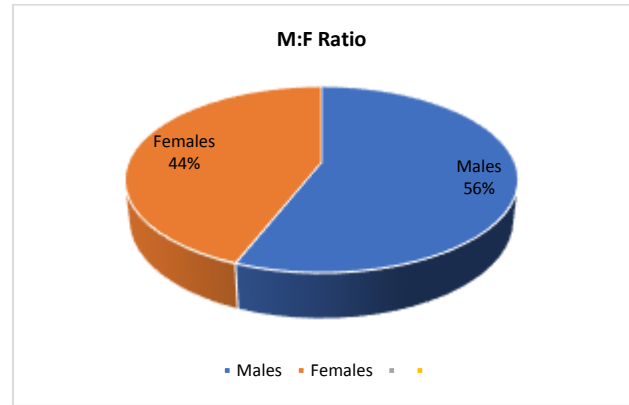


Fig-5, 6 & 7: gangrenous appendicitis dissection, Burst appendicitis with severe sepsis and sub-hepatic collection

Depending on their health, the patients were kept NPO for food and liquids for the following 24 to 48 hours before and were discharged on the third or fifth post-operative day. They were followed-up on four and eight weeks initially. A telephone survey was used to evaluate the long-term results.

RESULTS

The study's age range is 5-70 years, with a mean age of 19 with male predominance. The duration of surgery varies from 30 to 120 minutes, with a mean duration of 65 minutes. Hospital stays range from 48 to 96 hours on average.



There were 12 patients with complications, including paralytic ileus was seen in 1(2%), diarrhea in 2(4%), multiple or single (4% and 8%) port infections, and port TB in (4%). Open conversion was seen in 1 (2%) patient due to appendicitis burst haemorrhage. Every complication was treated cautiously.

Table-1: Mode of presentation

No	%
Classical	34 (68%)
Atypical	12(24%)
Recurrent/Chronic	4(8%)

Table-2: Complications

No	%
Multiple port infection	2(4%)
Single port infection	4(8%)
Port TB	2(4%)
Paralytic ileus	1(2%)
Conversion	1(2%)
Diarrhea	2(4%)

DISCUSSION

The appendicitis diagnosis tests surgeon's clinical judgement and its almost clinically diagnosed. Reports from radiological tests and lab investigations are helpful for ruling out alternative diagnosis¹⁵. The vermiform appendix should be surgically removed as soon as it becomes inflamed because waiting too long could endanger the patient's life. Since their first discovery, modern radiography techniques have advanced significantly and are now essential for diagnosis. Nonetheless, appendicitis is still primarily diagnosed clinically¹⁶. The surgeon's excellent clinical abilities and experience are more efficient than the lab and radiographic reports for diagnosis. Whether surgical procedure should be performed is still a problem. We conducted this study in an effort to find an answer to the question of whether laparoscopic appendectomy can replace conventional open appendectomy as the preferred method and in fact the gold standard¹⁷.

Three ports technique was the traditional method used. Sometimes a fourth port is needed. Telescopic ports are 10 mm in size. The other two ports are 3/5 mm and 5/10 mm, respectively. Unipolar diathermy is a source of energy. 50 patients who had

undergone peritoneal lavage after laparoscopic appendectomy were diagnosed with perforated appendicitis and were assessed on a number of factors, with the findings published. The results of the procedure were encouraging. Time ranges from 30 to 120 minutes, with a mean of 65 minutes, indicating that the process is not time-consuming. The time was 54 ± 14.4 minutes in a study by Biondi et al compared to an average of 80 minutes in a study by Katkhouda et al in 2015, 25 minutes in a study by Costa-Navarro et al in 2018, and 52.2 minutes in a study by Minutolo et al in 2016¹⁷⁻¹⁸. The laparoscopic appendectomy (LA) is currently the preferred surgical procedure in many nations. Regarding diagnosis, elimination of further pathology, surgical treatment, wound infection (port infection), and hospital stay, LA is superior to open appendectomy¹⁹.

Laparoscopy is not widely used in Pakistan. The primary users of Laparoscopy are hospitals in large cities. Laparoscopic surgery is seldom offered in smaller cities or rural areas. The main causes of this discrepancy are lack of resources and lack of knowledge²⁰⁻²¹. Basic laparoscopic abilities have a rather flat learning curve. But, the widespread hasn't been adequate because there aren't enough educational facilities. In a nation like Pakistan, the cost-effectiveness of laparoscopic surgeries is a significant problem. In both private and public hospitals in Pakistan, appendectomy procedures are frequently carried out²²⁻²³. The opportunity to apply their knowledge and advance their skills by accomplishing a laparoscopic appendectomy is significant for surgeons who have access to a laparoscopic setup. Eventually, they will develop the necessary skills to effectively treat the appendicitis complications²⁴.

Despite these limitations, the study's results were encouraging and suggest that laparoscopic appendectomy may eventually replace open surgery as the preferred method of treating acute appendicitis and associated complications.

CONCLUSION

Laparoscopy has proven to be a successful method for treating perforated appendicitis overall, and the outcomes are comparable to those of other research on related subjects. If surgeons are adequately trained, it is feasible, achievable and both experienced and beginners surgeons can perform it.

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