

**SAFETY AND FEASIBILITY OF LAPAROSCOPY IN COMPLICATED APPENDICITIS
IN CHILDREN: A TERTIARY CARE HOSPITAL EXPERIENCE FROM KASHMIR**Fayaz Ahmad Najar¹, Asim Rafiq Laharwal^{2*}, Iram Jaan³, Syed Shakeeb Arsalaan¹ and Zaffar Saleem
Khanday⁴¹Senior Resident, Department of General Surgery, GMC Srinagar.²Lecturer, Department of General Surgery, GMC Srinagar.³Lecturer, Department of Physiology, GMC Srinagar.⁴Associate Professor, Department of General Surgery, GMC Srinagar.***Corresponding Author: Dr. Asim Rafiq Laharwal**

Lecturer, Department of General Surgery, GMC Srinagar.

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ABSTRACT

Introduction: Acute appendicitis is the most common surgical emergency in children in any tertiary health care facility. Laparoscopic appendectomy has gained widespread popularity over the past two decades. Laparoscopic appendectomy is an accepted treatment modality in uncomplicated paediatric appendicitis. However, in cases of complicated appendicitis the role of laparoscopic management is not well established. The goal of this study was to demonstrate the safety, efficacy, and potential benefits of laparoscopy in the management of complicated appendicitis in children. **Material and Methods:** A total of 40 patients were operated on for complicated acute appendicitis and were observed in this study in terms of operative time, hospital stay and post-operative morbidity and mortality. **Results:** Maximum number of patients belonged to the age group of 4 - 8 years (76%). There was a male preponderance with male: female ratio of 3:1. All the appendectomies were completed laparoscopically. The mean operative time was 58 minutes. Drain was kept in all patients and mean duration of drain removal was 2.5 days. Persistent fever was the main complication and was documented in 2 (5%) of patients, intra-operative bleeding in another 2 (5%) patients, followed by port-site infection and post-operative intra-abdominal abscess in 1 (2.5%) patient each. The mean post-operative length of hospital stay was 3.5 days. No mortality was observed. **Conclusion:** Laparoscopy is a safe and an effective alternative for appendectomy in children for gangrenous/perforated appendicitis; with a shorter length of hospital stay and acceptable rate of complications. However, close postoperative follow-up and a high index of suspicion for development of complications is recommended.

KEYWORDS: Laparoscopy, Appendectomy, Perforation, Children.**INTRODUCTION**

Acute appendicitis is the most common surgical emergency in children in any tertiary health care facility. Open appendectomy has been the "gold standard" since ages. The first laparoscopic appendectomy was performed in 1983 by Kurt Semm and since then has become increasingly popular.^[1] The rate of appendicular perforation is much higher in children as compared to adults.^[2] Laparoscopic appendectomy is an accepted treatment modality in uncomplicated paediatric appendicitis. The surgical management of complicated paediatric appendicitis (gangrenous or perforated) has been more controversial, and the role of laparoscopy in its treatment has not yet been established fully.^[3,4] Laparoscopy has the potential to decrease hospital stay and expedite return to normal activities and has been demonstrated in the paediatric population with simple appendicitis.^[5,6] However, Intraabdominal abscess (IAA)

can form after laparoscopic appendectomy (LA), especially in complicated cases and is associated with significant morbidity.^[3,7,8] The goal of this study was to demonstrate the safety, efficacy, and potential benefits of laparoscopy in the management of perforated appendicitis in children.

MATERIAL AND METHODS

This was an observational study conducted in the General Surgery department of Government Medical College, Srinagar. All the patients under the age of 16 years, operated on for perforated appendicitis between September 2017 and September 2020 were observed. Patients in the age group of 2 - 15 years, presenting in the emergency department with history of acute appendicitis were thoroughly examined and investigated; those patients with complicated appendicitis were then

identified and selected for laparoscopic appendectomy (LA).

All the patients were kept nil per oral once admitted; intra-venous fluids were administered according to requirement along with either triple antibiotics (cephalosporin + aminoglycoside + metronidazole) or a broad-spectrum antibiotic with metronidazole. Then the patients were planned for laparoscopic appendectomy. In all cases 3 port appendectomy was performed.

LA is performed with the patient under general anesthesia and with insufflation of CO₂ for pneumoperitoneum. Insufflation pressure was controlled automatically and kept below 12 mm Hg. The bladder was emptied with insertion of a Foley catheter. A standard 3-trocar technique (**Figure A**) was used with two 5-mm trocars and one 5/10/12-mm trocar for the introduction of telescope. All trocars are placed under vision. The abdomen was gently explored, and the appendix identified. The appendix was freed, and the mesoappendix was divided between applied clips or by harmonic scalpel. The appendiceal base was freed, visualized and tied either by available loops or by intracorporeal suturing technique; the freed appendix was placed in an indigenously made endo retrieval bag and removed. Thorough peritoneal lavage was done and haemostasis secured. When present, a special effort was made to debride the fibrin peel from the peritoneum. The drain was placed through the suprapubic port site. The insufflated gas was released progressively. After removal of the trocars, the fascia and the skin edges were approximated with absorbable sutures. Postoperative analgesia and perioperative intravenous antibiotics were administered according to the requirement, in the same manner as in open appendectomy. The pre-operatively started antibiotics were continued during their entire hospital stay. An oral diet was usually resumed after 24 hours.

Data concerning gender, age, weight, mean operative time, length of hospital stay, and complications were recorded and analysed.



Figure A: Port placement picture.

RESULTS

A total of 40 patients, were operated on for complicated appendicitis and were observed in this study. All the patients were in the age group of 2 - 15 years, with maximum number of patients belonging to the age group of 4 - 8 years (76%). The male were predominant with a male: female ratio of 3:1. All the appendectomies were completed laparoscopically. The mean operative time was 58 minutes (range 30 -90 minutes). Drain was kept in all patients and mean duration of drain removal was 2.5 days. Total of 6 (15%) patients had post-operative complications. Persistent fever was the main complication in the post-operative period and was documented in 2 (5%) of patients; blood and urine culture/sensitivity was done and antibiotic tailored accordingly and both the patients responded and recovered fully. Intra-operative bleeding was observed in 2 (5%) patients, however none required blood transfusion. Port-site infection and post-operative abscess developed in 1 (2.5%) patient each. Both of these patients were managed conservatively and were discharged with home-parenteral antibiotic but were strictly followed-up for any complications. The mean post-operative length of hospital stay was 3.5 days (range 2 - 8 days). (**Table 1**) None of the patients developed features of peritonitis or enterocutaneous fistula in post-operative period. No mortality was observed in our study.

Table 1: Demographic profile and results of our study.

Parameter	N (%)
Number of patients	40
Male: Female Ratio	3:1
Mean operative time in minutes (range)	58(30-90)
Total complication	6 (15%)
Intraoperative bleeding	2(5%)
Postop Intra-abdominal abscess formation	1(2.5%)
Postoperative fever	2(5%)
Port site infection	1(2.5%)
Mean hospital stay in days (range)	3.5 (2-8)

DISCUSSION

Most of the surgeons in present times are using laparoscopy in the management of acute appendicitis. Although many surgeons are comfortable at removing a simple acute appendix laparoscopically, but still many surgeons hesitate to remove a grossly perforated appendix laparoscopically. It has been suggested that visualization of the abdominal cavity seems to be improved with laparoscopy. The pelvis and the abdominal cavity can be thoroughly irrigated, debrided, and drained. Coexisting pathology can be identified and addressed. The surgery is less traumatic, and most patients return to their regular activities sooner.^[9,6]

On the other hand, in cases of complicated (perforated) appendicitis, anatomy can be obscure and the operative time can be significantly prolonged. Laparoscopy in

complicated cases of acute appendicitis can be a challenging and technically demanding procedure that requires more than basic laparoscopic skills. There is limited tactile sensation, manipulation of inflamed tissues is difficult, and inadvertent injury to adjacent organs is possible. One should attempt laparoscopy in these complicated cases only after performance of many routine laparoscopic appendectomies. When treated laparoscopically, some surgeons have noted that patients with perforated appendicitis may have an increased incidence of infectious complications and should be avoided.^[3,10,11,12,13]

Our recent findings suggest that laparoscopy can be a reasonable therapeutic alternative to open appendicitis in these complicated cases. The incidence of postoperative intra-abdominal abscess formation after laparoscopy in children with perforated appendicitis varies anywhere between 5.8% and 41%.^[3,7,8,14] Some of these abscesses are treated with antibiotics, but most of them require drainage. In our study, the intra-abdominal abscess formation was observed in 2.5 % of patients and was managed conservatively. However, the overall complication rate in our study was 15%.

CONCLUSION

In trained and experienced hands, laparoscopic appendectomy is a safe alternative for the treatment of complicated appendicitis in children. However, close postoperative follow-up and a high index of suspicion for development of complications is essential.

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