Original Research Article

Comparative Study on Laparoscopic vs Open Appendicectomy in the Treatment of Perforated Appendicitis

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Received: 29-05-2023 / Revised: 07-06-2023/ Accepted: 17-06-2023

Abstract

Background: Acute appendicitis is one of the most common causes of surgical emergency and perforated appendicitis is associated with higher morbidity and longer hospital stays. In recent times considering the overall benefits of laparoscopic surgeries, it has been widely preferred in the treatment of complicated appendicitis.**Aim:** To compare the outcome of laparoscopic appendicectomy (LA) vs open appendicectomy (OA) in the treatment of perforated appendicitis.**Materials and Methods:** 62 patients presenting with perforated appendicitis and undergoing surgical intervention in the Department of General Surgery, Kozhikode. Patients were monitored immediate postoperative period for 4 weeks for the development of complications.**Results:** Out of 31 patients who underwent laparoscopic none of the patients developed wound infection with a mean duration of hospital stay of 3.5 days. In open appendicectomy 7 patients developed wound infection with a mean duration of hospital stay of 5.3 days.**Conclusion:** Laparoscopic procedure for perforated appendicitis is a safe and feasible procedure which can be performed with a low incidence of infectious complications, possibly offering patients faster recovery and better cosmetic benefits than the open procedure. It has a clinically significant advantage. The patient's factor and the experience of the surgeon both are deciding factors in the decision-making for the treatment approach.

Keywords: laparoscopic appendicectomy, complicated appendicitis

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Introduction

Perforated appendicitis is a common surgical emergency characterized by the rupture of the appendix, leading to the spillage of its contents into the peritoneal cavity. It is associated with increased morbidity, longer hospital stays, and higher healthcare costs compared to uncomplicated appendicitis. Timely intervention and appropriate surgical management are crucial in achieving favourable outcomes for patients with perforated appendicitis.

Appendicectomy, the surgical removal of the appendix, has long been considered the gold standard treatment for appendicitis. Traditionally, open appendicectomy, involving a larger incision and direct visualization of the appendix, has been the preferred approach for perforated appendicitis. However, with the advancements in minimally invasive techniques, laparoscopic appendicectomy has gained popularity as an alternative method. Laparoscopic appendicectomy offers several potential advantages, including smaller incisions, reduced postoperative pain, faster recovery, and improved cosmetic outcomes.

The laparoscopic approach allows for better visualization and identification of intra-abdominal structures, facilitating thorough irrigation and debridement of the peritoneal cavity. These factors have contributed to the increasing adoption of laparoscopic appendicectomy in the management of both uncomplicated and complicated appendicitis, including perforated cases. Despite the growing utilization of laparoscopic appendicectomy, controversy persists regarding its efficacy and safety compared to open appendicectomy for perforated appendicitis. Several studies have reported conflicting results regarding the optimal surgical approach, leading to ongoing debates among surgeons regarding the preferred method for this specific subgroup of patients.

This study aims to provide a comprehensive comparative analysis of laparoscopic and open appendicectomy for perforated appendicitis. By synthesizing the existing literature, we intend to evaluate the outcomes, including postoperative complications, length of hospital stay, time to return to normal activities, and surgical site infection associated with each approach

.Understanding the relative merits and drawbacks of laparoscopic and open appendicectomy for perforated appendicitis is crucial in guiding surgical decision-making and optimizing patient care. By shedding light on the current evidence and identifying areas of further research, this study aims to contribute to the ongoing discussion surrounding the optimal surgical management of perforated appendicitis.

Materials and Methods

Study design and settings

After obtaining approval from the institutional ethics committee a prospective study was conducted at the Department of General Surgery, Government Medical College, Calicut, Kerala, India.

Study population

Patients with Perforated appendicitis above the age of 13 coming to casualty, Government Medical College, Kozhikode.

Inclusion criteria

Patients above the age of 13 years presenting with perforated appendicitis in Surgery Department, Government Medical College, Kozhikode.

Exclusion criteria

Patients who have not given consent to Pregnant women
Previous history of laparotomy

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Data collection method

All the cases of perforated appendicitis admitted to the Department of General Surgery were enrolled in the study. Patients who did not give consent and pregnant women were excluded from the study.

After admission, the Patient will be allocated alternatively to laparoscopic and open appendicectomy (Lower midline laparotomy) groups and a detailed history will be collected directly from the patient's or the patient's relatives accompanying the patient by direct interview. The proforma will be filled out after the interview.

After taking well informed & written consent, parameters like post-operative pain, post-operative ileus, post-operative intra-abdominal collection, wound infection and duration of stay were observed between the two procedures.

Postoperative pain was assessed using the Numeric pain rating scale (NPRS), which is a 10-point scale.

Post-operative USG was taken in all symptomatic post-operative patients to assess the intra-abdominal collection. All the patients were followed in the post-operative period till they were discharged and then later followed for 4 weeks in the outpatient department.

A master chart was prepared with the data collected which was coded and entered in Microsoft Excel and statistical analysis was done using the software statistical package for social sciences (SPSS) using appropriate statistical tests.

Results

62 patients with perforated appendicitis participated in this study out of which 31 patients underwent laparoscopic appendicectomy and 31 patients underwent open appendicectomy.

43 patients were male (30.6%) and 19 patients were female (69.4%).

Table 1: Wound infection

			Procedure	
			Lap	**Open**
Wound Infection	No	Count	31	24
		% of Total	100.0%	77.4%
	Yes	Count	0	7
		% of Total	0.0%	22.6%
Total		Count	31	31
		% of Total	100.0%	100.0%

Chi-square statistic: 7.891
P-value: 0.005
Inference: There exists a significant association
In the LA group - 0 patients developed wound infection
In the OA group - 7(22.6%) patients developed wound infection

Table 2: Duration of hospital stay

	Procedure	**Total**	**Mean**	**Standard Deviation**	**p- value**	**Inference**
Duration of Stay	Open	31	5.3871	2.83640	0.015	There exists significant difference
	Lap	31	3.5806	2.84926		

p-value: 0.015
There exists a significant difference
In the LA group - the mean duration of stay is 3.5 days In the OA group - the mean duration of stay is 5.3 days

Table 3: Post-Operative Pain

			Procedure	
			Lap	**Open**
Post-Operative Pain	Mild	Count	21	15
		% of Total	67.8%	48.4%
	Moderate	Count	5	8
		% of Total	16.1%	25.8%
	Severe	Count	5	8
		% of Total	16.1%	25.8%
Total		Count	31	31
		% of Total	100%	100.0%

Chi-square statistic: 2.385
P-value: 0.304
Inference: There is no significant association
In the LA group - 15(48.4%) patients had mild, 8(25.8%) patients had moderate and 8(25.8%) patients had severe pain
In the OA group - 21(67.8%) patients had mild, 5(16.1%) patients had moderate and 5(16.1%) patients had severe pain

Table 4: Post-Operative ileus

			Procedure	
			Lap	**Open**
Post-Operative Ileus	No	Count	26	23
		% of Total	83.9%	74.2%
	Yes	Count	5	8
		% of Total	16.1%	25.8%
Total		Count	31	31
		% of Total	100.0%	100.0%

Chi-square statistic: 0.876
P-value: 0.349

Inference: There is no significant association
In the LA group - 5(16.1%) patients developed postoperative ileus In the OA group - 8(25.8%) patients developed post-operative ileus

Table 5: Post-Operative intra abdominal collection

			Procedure	
			Lap	**Open**
Post-Operative Intra Abdominal Collection	No	Count	28	24
		% within Procedure	90.3%	77.4%
	Yes	Count	3	7
		% within Procedure	9.7%	22.6%
Total		Count	31	31
		% within Procedure	100.0%	100.0%

Chi-square:1.908 p-value: 0.167
Interfere: There is no significant association
In the LA group, - 3(9.7%) patients developed a postoperative intraabdominal collection
In the OA group, - 7(22.6%) patients developed a postoperative intraabdominal collection

Discussion

This study was done to compare the outcomes of laparoscopic vs open appendicectomy in the treatment of perforated appendicitis. Laparoscopic appendectomy has long been considered risky and hence not being routinely performed in cases of complicated appendicitis. However, this view has been disputed in various studies that have compared different outcomes in both open and laparoscopic appendectomy.

In our study, we have compared the procedures by assessing the following factors: Wound infection and mean duration of hospital stay. There is no conversion of laparoscopic surgery to open.

According to our results, Laparoscopic appendectomy is associated with a significantly lower rate of wound infection in comparison with open appendectomy. None of the 31 patients operated by the laparoscopic method developed wound infection whereas, among the open appendectomy cases, 7 of them (22.6%) developed wound infection. These results were compared with a study done by A.Yagmurlu *et al.,* who also reported a higher incidence (23%) of wound infection in patients who underwent open surgery., post ope Another study was done by Mohammed *et al*., also reported similar findings of about 24.4% of wound infections in open appendectomy cases and a significantly lower incidence (8.3%) of wound infection in laparoscopic appendectomy cases. The lower rates of wound infection in laparoscopic appendectomy may be explained by the fact that, in comparison to open appendectomy, laparoscopic appendectomy needs less handling of the gut by the surgeon's hands and tools. A further benefit of laparoscopic appendectomy is that the appendix is examined in situ, preventing the gut from coming into direct contact with the incision in the layers of the anterior abdominal wall.

Duration of hospital stay following surgery was one of the parameters assessed in our study and a statistically significant difference was noted between the two groups. This is following other studies done by Horvath, P *et al*., Mohamed *et al*., and Talha, Ahmed *et al*.,

In our study, Out of 62 patients, 31 patients underwent open appendicectomy and 31 patients underwent laparoscopic appendicectomy. Most of the patients in the study were males (69.4%). We observed that the laparoscopic appendicectomy group had no wound infection (zero) and a shorter duration of hospital stay (mean duration of stay 3.5 days). In the open appendicectomy group, 7 patients (22.6%) developed wound infections and the mean duration of hospital stay was 5.3 days.

Other parameters compared between the two groups including post-operative pain, post-operative ileus and post-operative intraabdominal collection are statistically insignificant.

Conclusion

Laparoscopic procedure for perforated appendicitis is a safe and feasible procedure which can be performed with a low incidence of infectious complications, possibly offering patients faster recovery and better cosmetic benefits than the open procedure. It has a clinically significant advantage.

The patient's factor and the experience of the surgeon both are deciding factors in the decision-making for the treatment approach.

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Conflict of Interest: Nil Source of support: Nil