ORIGINAL RESEARCH

Comparision of the outcomes of open appendectomy vs laproscopic appendectomy

Dr. Himanshu Choyal[1], Dr. Nitesh Amrawanshi[2], Dr. Prashik Meshram[3], Dr. Charmi Patidar[4], Dr. Rishabh Patidar[5], Dr. Satyendra Prasad Mukhiya[6], Dr. Rajshree Mukhiya[7]

[1,4]Assistant Professor, [2]Junior Resident, [3]Senior Resident, [6]HOD & Professor, [7]Professor, Department of General Surgery, R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India
[5]Senior Resident, Department of General Surgery, Dr. Laxmi Narayan Pandey Government Autonomous Medical College, Ratlam, Madhya Pradesh, India

Correspondent Author
Dr. Charmi Patidar
Assistant Professor, Department of General Surgery, R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India

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ABSTRACT
Background: Laparoscopic appendectomy for non perforated appendicitis is associated with improved outcomes. This study compares laparoscopic appendectomy and open appendectomy in cases of a perforated appendix by assessing surgical site infection, mean operating time, and
This study was a prospective randomized study conducted at the Department of Surgery at RDGMC between Feb 2021 to March 2022 for 54 patients who underwent laparoscopic or the open appendectomy technique.
Results: The frequency of wound site infection was significantly higher in open appendectomy than in the laparoscopic approach . Mean hospital stay was slightly longer in the laparoscopic approach than in open appendectomy. Mean operating time for laparoscopic appendectomy was less as compared to open appendectomy.
Conclusion: Laparoscopic appendectomy was associated with fewer surgical site infections and shorter mean operating time than an open appendectomy.
Keywords: open appendectomy, laparoscopic, appendectomy, perforated appendix

INTRODUCTION

The appendix is a blind-ended tube connected to the cecum, from which it develops in the embryo. The most common diseases of the appendix (in humans) are appendicitis and carcinoid tumours . Appendicitis is inflammation of the appendix. Symptoms commonly include right lower abdominal pain, nausea, vomiting, and decreased appetite(1). According to the literature, in their life time approximately 7% of the population develops appendicitis (12% in men and 25% in women), with maximum incidence between the ages of 10-30 years and overall male to female ratio being 1.2:1.3(2,3,). Appendicitis is caused by the blockage of the hollow portion of the appendix. Blockage may be caused by calcified stone or inflamed lymphoid tissue due to infection, gallstones or tumours. As a result of blockage, pressure and bacterial growth increases with decreased blood flow to the tissue(1 Despite a lot of randomized trials which have compared laparoscopic and open appendectomy, the indications for laparoscopy in patients with suspected appendicitis remains controversial. Laparoscopic appendectomy is critiqued for the cost of the surgical equipment's. It has been almost two decades since the introduction of laparoscopic method, but still a controversy exist in acknowledging benefits of it over the traditional method.

So this study is being conducted in a tertiary care centre with the aim of comparing patient's duration of surgery, postoperative pain, post-operative complications, hospital stay, recovery, cosmetic appearance and accidental findings during the procedure between open and laparoscopic appendectomy.

AIMS AND OBJECTIVES

AIMS

To compare the outcome of laparoscopic and open appendectomy.

OBJECTIVES

1. Operative time

2. Postoperative morbidity
a Pain
b Postoperative nausea/vomiting
c Wound infection
3 Postoperative hospital stay
4 Cosmetic benefit

MATERIALS AND METHODS

This is an observational descriptive study of 54 patients attending surgery OPD from Februrary 2021 to March 2022,of C.R, Gardi hospital with clinical diagnosis of acute or recurrent appendicitis

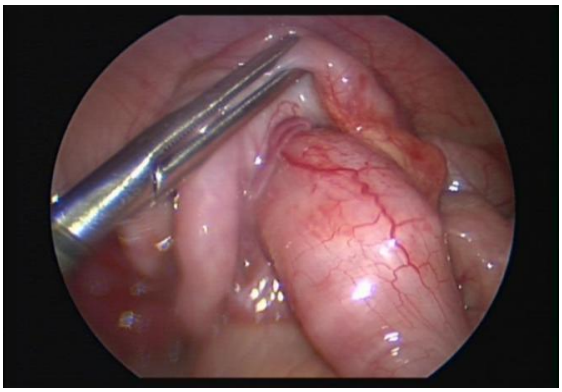
INCLUSION CRITERIA

1. All adult (>12 years) patients with clinically confirmed or radiologically confirmed acute/chronic appendicitis.
2. Those who consent to participate in the study.

EXCLUSION CRITERIA

1. Patients with associated gynaecological problems
2. Patients less than 12 years of age.
3. Appendicular abscess.
4. Pregnancy

Open appendectomy



Lap appendectomy

OBSERVATIONS AND RESULTS

The present study included 54 cases with mean age 29.93±11.41 years which were studied prospectively under the following groups:

- Laparoscopic appendectomy - 27 cases
- Open appendectomy - 27 cases

Table 1: Age distribution of the cases

Age groups	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
12-20	6	22.2%	4	14.8%
21-30	11	40.7%	14	51.9%
31-40	4	14.8%	6	22.2%
41-50	5	18.5%	1	3.7%
51-60	1	3.7%	2	7.4%
Total	27	100.0%	27	100.0%
Mean age	30.22±11.60 years		29.71±11.43 years	

Majority of the patients were belongs to 21-30 years of age at presentation. The mean age was 30.22±11.60 years and 29.71±11.43 years in the laparoscopic and open group respectively, with the range of 12 to 60 in the open group and 16 to 62 years in the laparoscopic group.

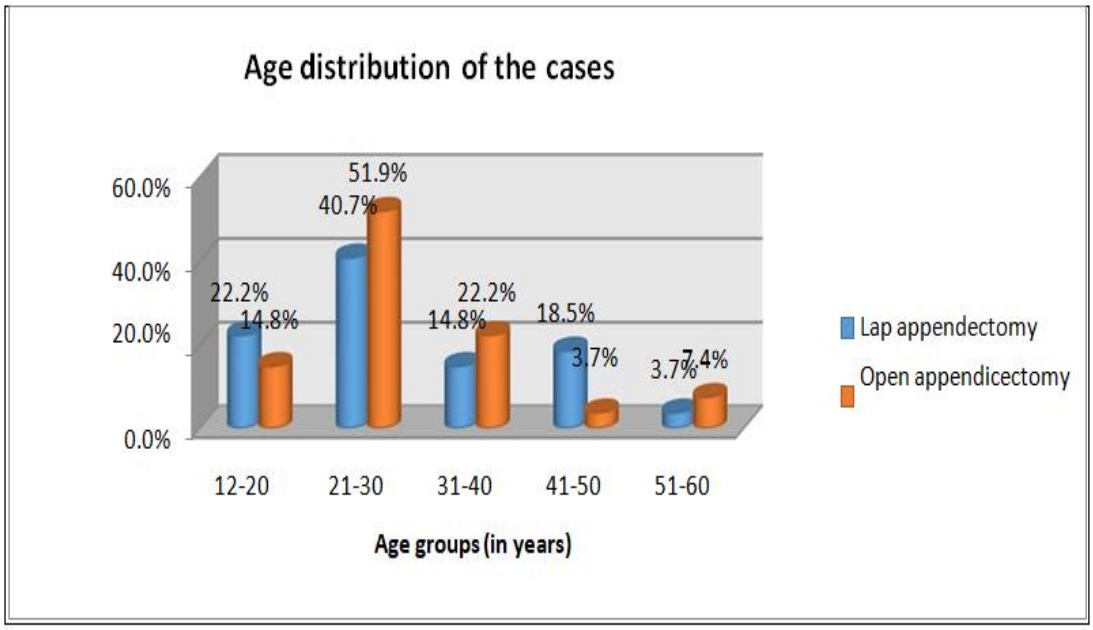


Table 2: Gender distribution of the cases

Gender	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
Male	16	59.3%	18	66.7%
Female	11	40.7%	9	33.3%
Total	11	40.7%	9	33.3%

The male of female ratio in the laparoscopic appendectomy was 1.68:1 and in the open appendectomy group was 1.5:

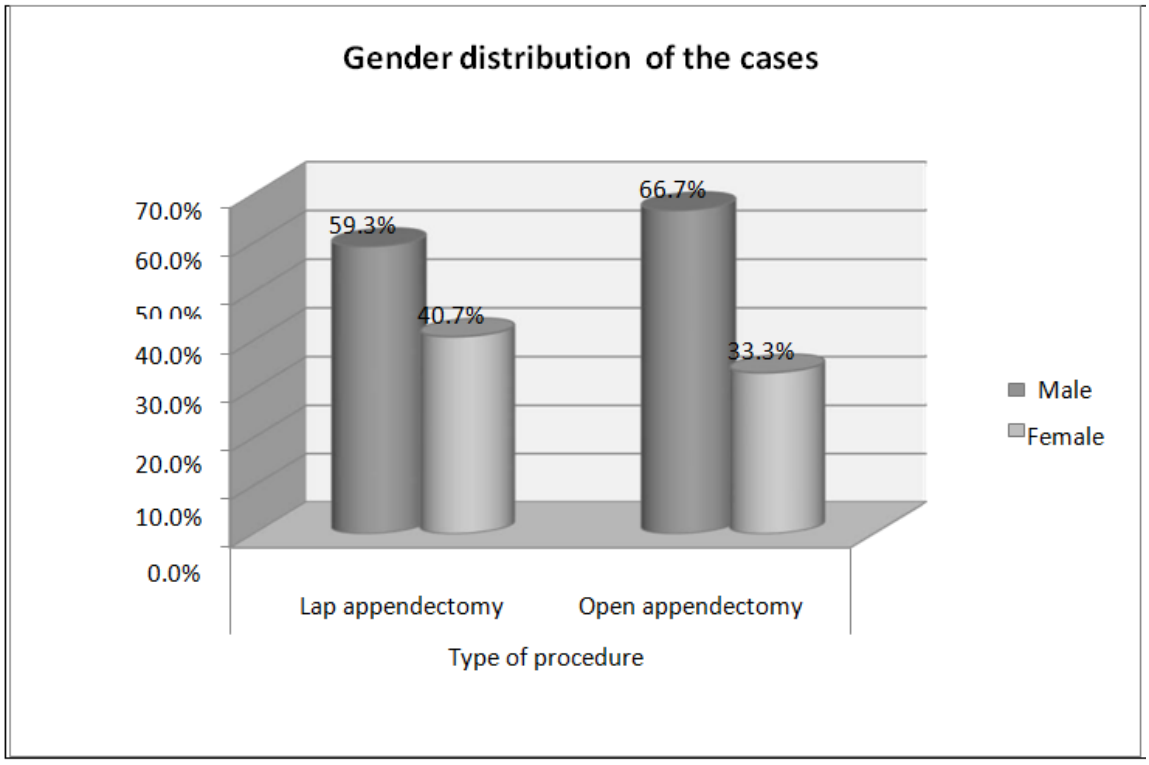


Table 3: Degree of adhesions around the appendix Thus, there was no significant difference in the degree of adhesions of the appendix to the surroundings in both types of procedure with chi square = 0.384, p = 0.821.

Degree ofadhesions	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
Dense adhesions	8	29.6%	9	33.3%
Flimsy adhesions	17	63.0%	15	55.6%
No adhesion	2	7.4%	3	11.1%
Total	27	100.0%	27	100.0%
Chi-Square = 0.384, p 0.821				

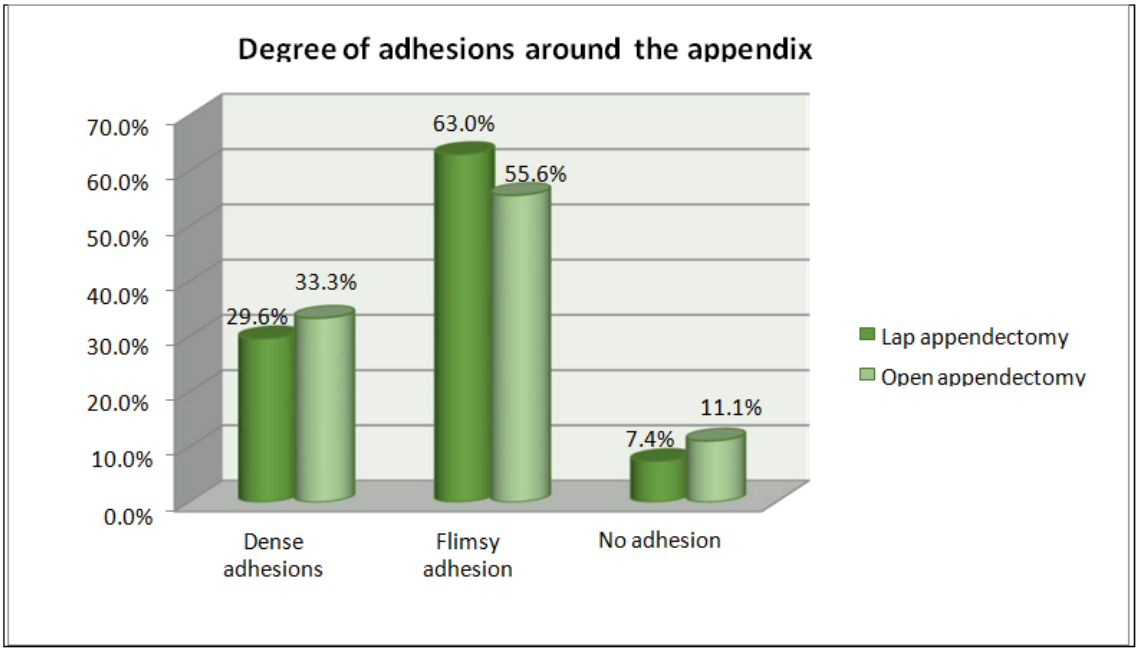


Table 4: Position of Appendix

Position ofAppendix	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
Ret.cec	18	66.7%	17	63.0%
Pre.ileal	1	3.7%	1	3.7%
Post.ileal	1	3.7%	3	11.1%
Pelvis	5	18.5%	5	18.5%
Paracecal	2	7.4%	1	3.7%
Total	27	100.0%	27	100.0%
Chi-Square = 1.36, p = 0.851				

There was no significant association was found among both procedures with Chi-square 1.36, p = 0.851 in the position of Appendix.

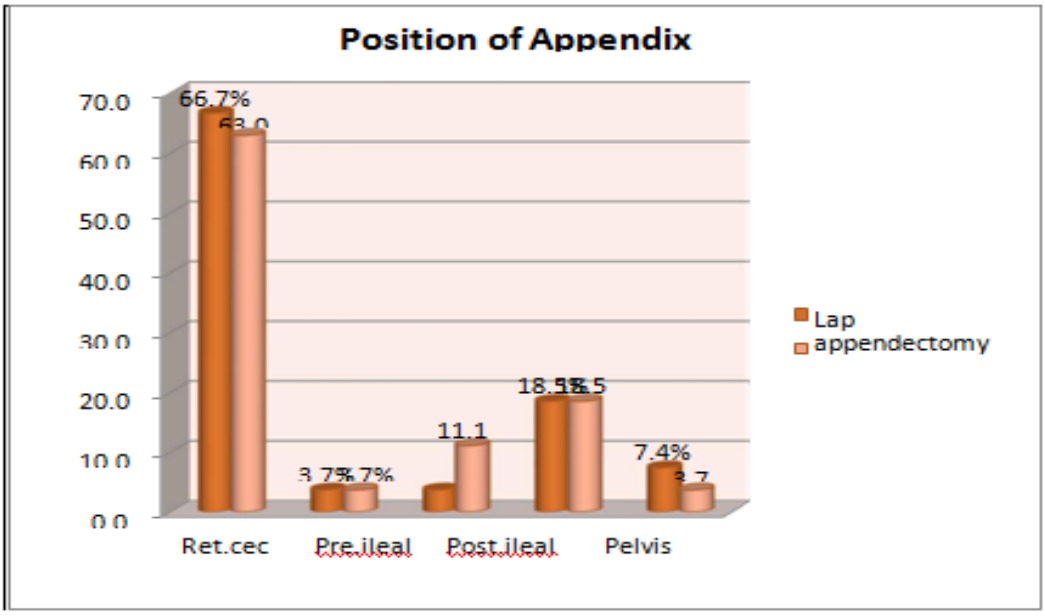


Table 5: Operating time according to type of procedure Significant association was found between operative time and types of procedure. Lap appendectomy was associated to higher operative time as compare to open appendectomy with Chi-square 25.65, p = 0.000.

Operationtime (min)	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
<= 40	0	0.0%	20	74.1%
41 - 60	19	70.4%	6	22.2%
61 - 80	5	18.5%	1	3.7%
81-100	1	3.7%	0	0.0%
100-120	1	3.7%	0	0.0%
>120	1	3.7%	0	0.0%
Total	27	100.0%	27	100.0%
Chi-Square = 25.65, p = 0.000				

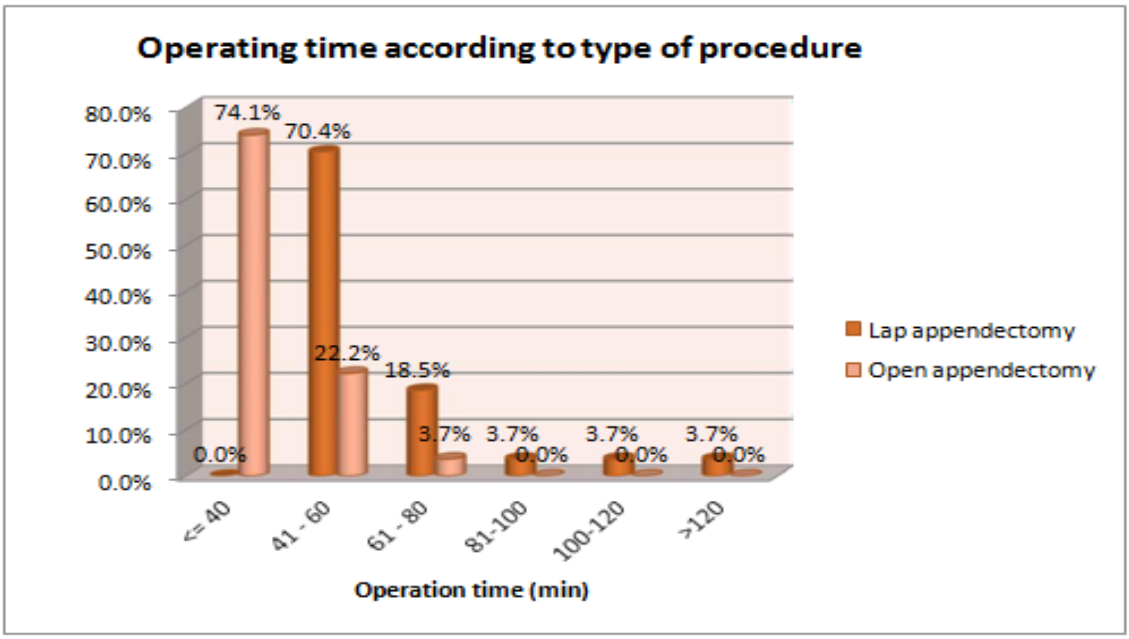


Table 6: Post-Operative Pain According To Type Of Procedure Significant association was found between VAS score and types of procedure. Lap appendectomy was associated to less VAS score as compare to open appendectomy with Chi-square 6.98, p = 0.02.

VAS Score(Pain)	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
0-2	15	55.6%	6	22.2%
3-4	8	29.6%	12	44.4%
5-6	2	7.4%	4	14.8%
7-8	2	7.4%	4	14.8%
9-10	0	0.0%	1	3.7%
Total	27	100.0%	27	100.0%
Chi-Square = 6.98 , p = 0.02				

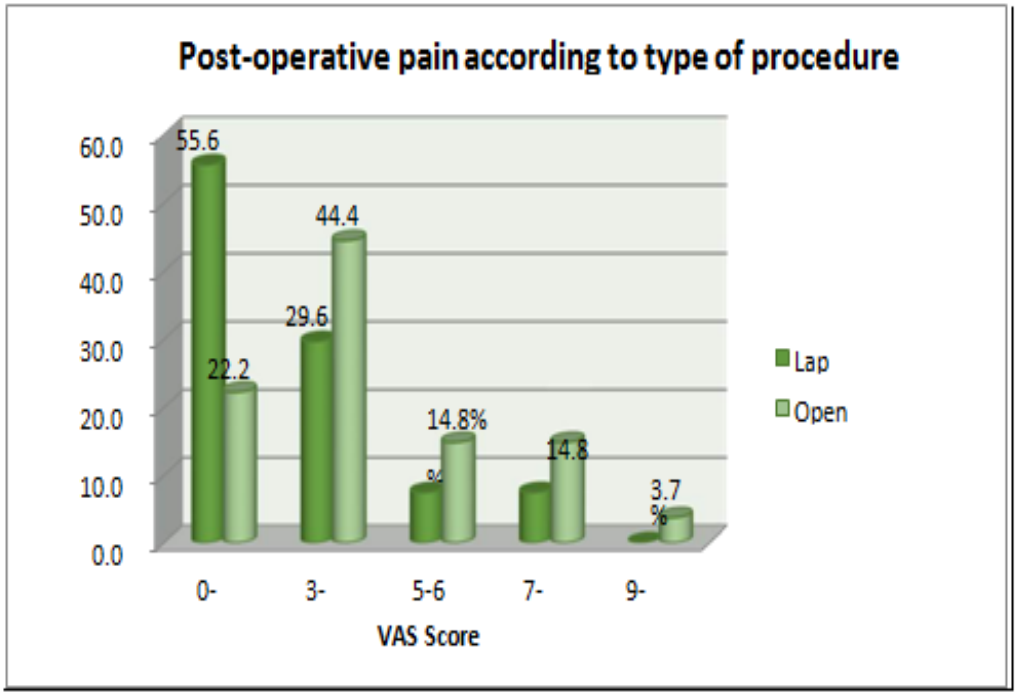


Table 7: Post-operative Nausea No significant association was found between nausea and types of procedure with Chi-square 3.84, p= 0.52 but nausea was generally more intense after laparoscopic appendectomy.

VAS (Nausea)	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
0	16	59.3%	20	74.1%
1	7	25.9%	3	11.1%
2	2	7.4%	3	11.1%
3	1	3.7%	1	3.7%
4	1	3.7%	0	0.0%
Total	27	100.0%	27	100.0%
Chi-Square = 3.84 , p = 0.52				

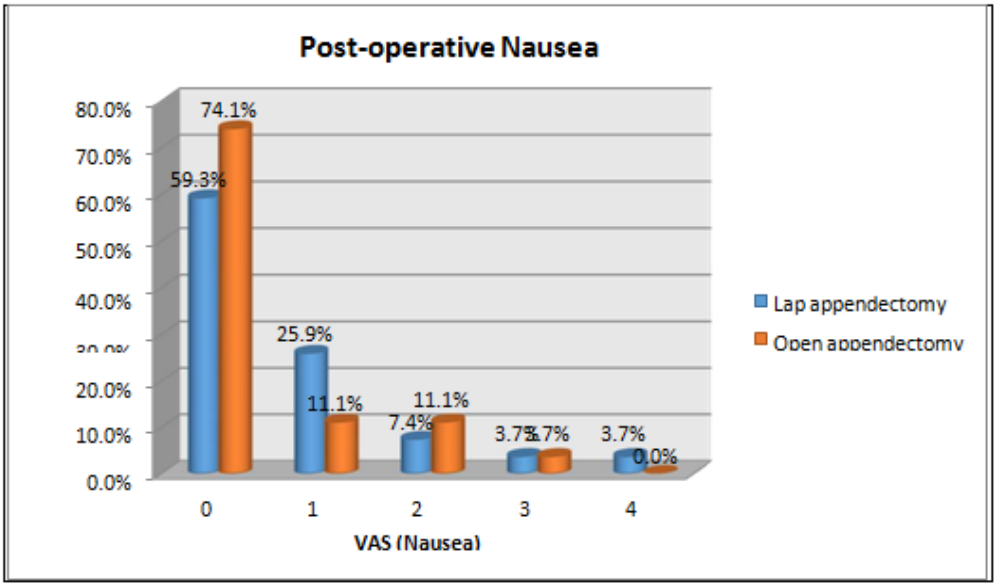


Table 8: Post-operative Complications according to type of procedure Significant association was found between complications and types of procedure with Chi- square 8.07, p = 0.01. Complications were significantly higher in open appendectomy as compare to Lap appendectomy.

Complications	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
Wound infection	2	7.4%	4	14.8%
Fever	3	11.1%	9	33.3%
Loose stools	0	0.0%	3	11.1%
No complication	22	81.5%	11	40.7%
Total	27	100.0%	27	100.0%
Chi-Square = 10.33 , p = 0.01				

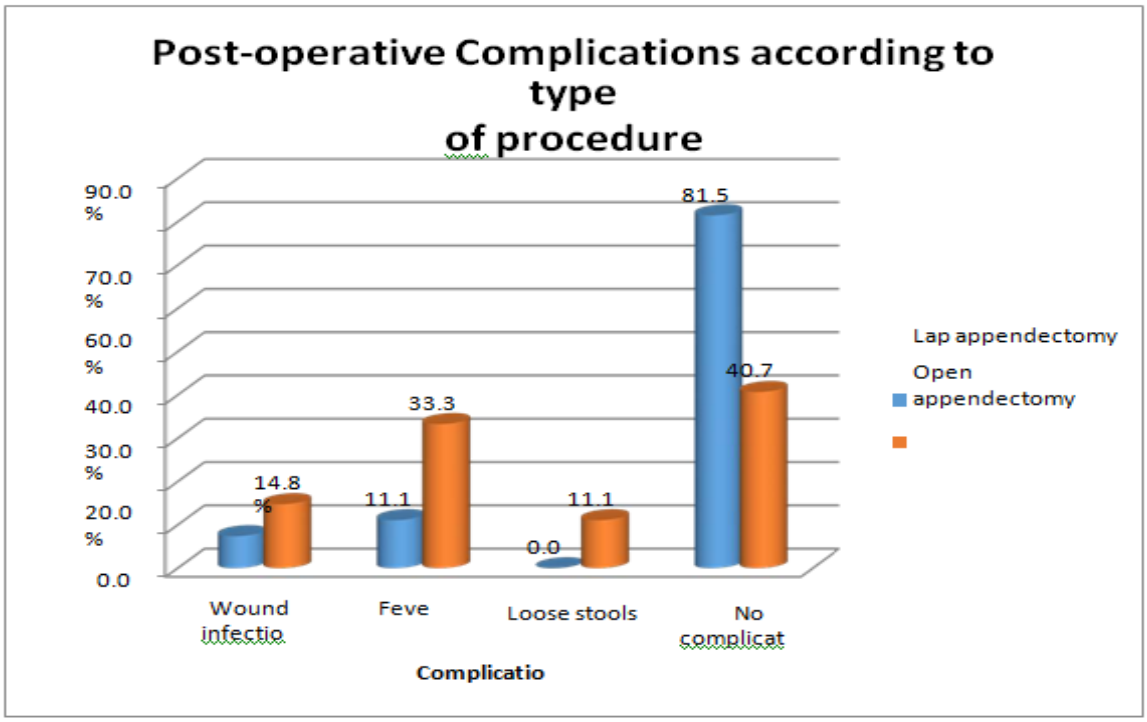


Table 9: Post-operative Hospital Stay Significant association was found between LOS and types of procedure with Chi-square 10.61, p = 0.001. LOS in days was significantly higher in open appendectomy as compare to Lap appendectomy

LOS IN DAYS	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
<= 2	19	70.4%	8	29.6%
3-4	8	29.6%	15	55.6%
>4	0	0.0%	4	14.8%
Total	27	100.0%	27	100.0%
Chi-Square = 10.61 , p = 0.001				

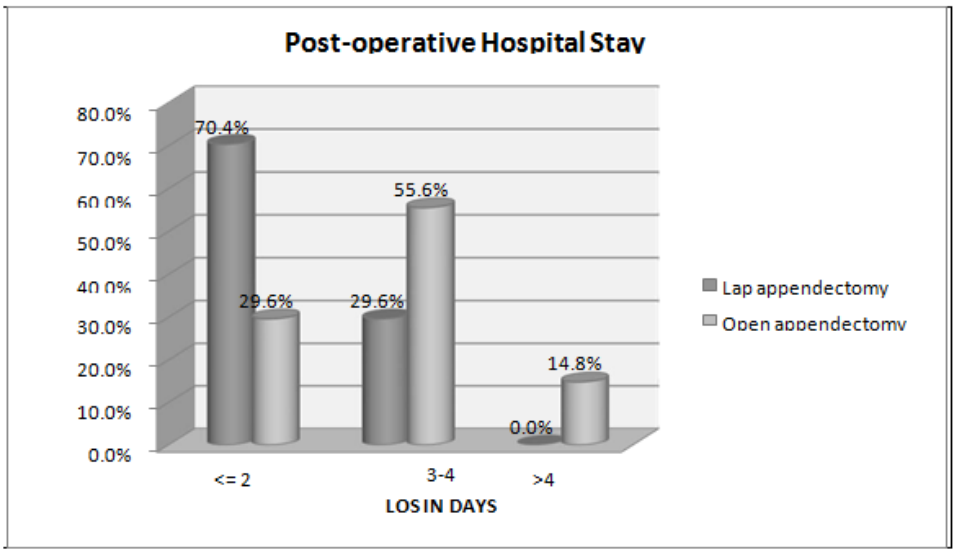
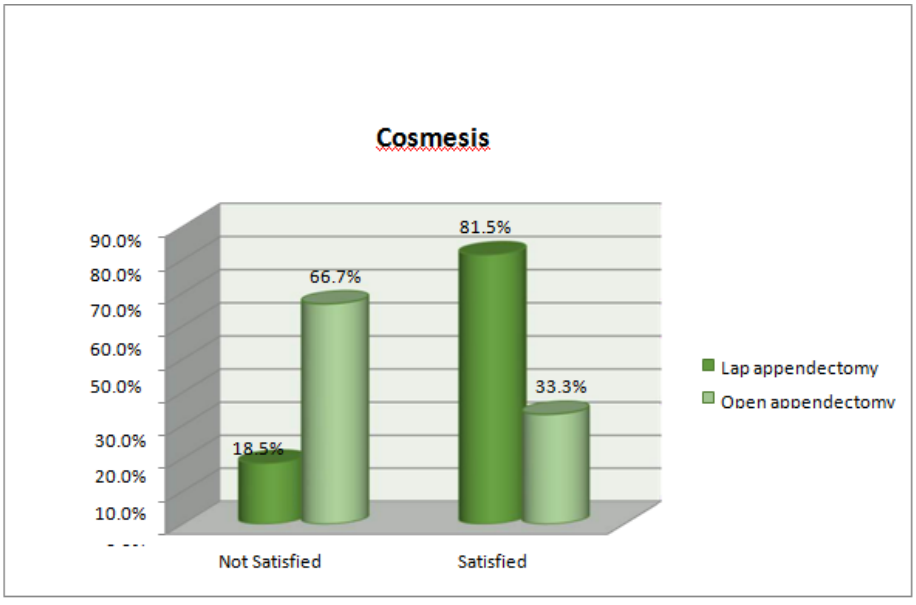


Table 10: Cosmesis

Cosmesis	Type of procedure			
	Lap appendectomy		Open appendectomy	
	N	%	N	%
Not Satisfied	5	18.5%	18	66.7%
Satisfied	22	81.5%	9	33.3%
Total	27	100.0%	27	100.0%
Chi-Square = 12.79 , p = 0.000				



DISCUSSION

Appendectomy, being the most common surgical procedure performed in general surgery, is still being performed by both open and laparoscopic methods. Laparoscopic and open appendectomy have been compared several times, since the introduction of minimally invasive technique as a diagnostic as well as a therapeutic measure, in an effort to establish the supremacy of one above the other. Because no consensus has been reached, both procedures are still being practiced actively despite randomized trials and prospective studies. The subject still needs additional comparisons. Furthermore, very few studies have been conducted in some countries where minimally invasive surgery has not been established fully. Keeping this background in mind, this comparative study was carried out to compare the postoperative outcomes of both procedures in diagnosed appendicitis. Present study compared a total of 54 cases (27 open appendectomies and 27 laparoscopic appendectomies) to compare one method with other and to evaluate our results in comparison with those of other studies. This study's age group was similar to age groups in a number of other studies where appendicitis is more prevalent in younger adults. According to numerous studies, laparoscopic appendectomy leads to a quicker recovery and early return to regular activities with fewer complications.

The length of the hospital stay was also reduced, which led to earlier feeding and hospital discharge.[14-16] Visual Analog Score (VAS), which has a score range of 0 to 10, with 0 representing no pain and 10 representing the most pain, was used to measure the intensity of surgical pain. VAS measurements were taken right away following surgery, then every hour for four hours, at eight hours, and at 24 hours. Compared to the open group, the laparoscopic group's pain score and analgesic usage time were found to be lower, at (3.4+-1.6) and (4.82+-1.9) and (4.2+-1.3) and (10.16+-4.2) respectively. This difference was found to be statistically significant at p=0.04, which is consistent with other studies.[17] According to this study, the open group experienced slightly more post-operative hospital days than the laparoscopic group, which is consistent with research by Hellberg et al, [18] as well as other randomised clinical studies and meta-analyses.[19]

An open group method is more common than a laparoscopic one when complicated appendicitis is present. Both groups experienced sickness and vomiting, and the open group after surgery saw a few intra-abdominal abscesses while the lap group did not. Similar research revealed that the lap group experienced less vomiting.[20] Due to longer muscle incision stretches and wound infection, the pain score in this study was higher in open surgery (10.16+-4.2) than in laparoscopic (4.82+-1.9), and this was found to be statistically significant at a pvalue less than 0.03. Despite being straightforward and efficient, the traditional open appendectomy has some drawbacks, such as the chance of unnecessary appendectomies, wound sepsis, and a delayed recovery.[21] This study found that laparoscopy greatly reduced the rate of postoperative wound infection, which is consistent with research by Marzouk M et al.[22] The 10mm trocar cannula sheath was used to retrieve the appendix specimen; there was no direct interaction with the port site. Plastic bags were used when the appendix was too big to fit inside the cannula. If required, the periappendiceal fluid collection was laparoscopically aspirated without contaminating the port opening. To avoid port site herniation, a single port closure vicryl suture was used to seal a 10mm port. Contrast this with an open method, which calls for numerous sutures to close the incisions and may encourage the collection of hematoma and infection.[23

SUMMARY AND CONCLUSION

We conducted a prospective observational study on fifty four patients of appendicitis within affixed protocol. The aims and objective of the study was to assess and compare the outcome of open appendectomy and laparoscopic appendectomy.

The study included 27 patients in open appendectomy group and 27 patients in laparoscopic appendectomy group. The two groups were similar to each other in terms of their distribution of age and sex characteristic.

Mean operation time was found significantly different between the both groups. The mean operation time was 41.04±9.01 min and 64.01± 18.74 min. respectively for the open and laparoscopic appendectomy.Laparoscopic appendectomy was significantly associated with less post operative pain with less complication rates.

Duration of stay in the hospital was significantly less with the laparoscopic appendectomy as compare to open appendectomy.

Laparoscopic appendectomy is beneficial in diagnosis of additional pathology as compared to open appendectomy and scar of laparoscopic appendectomy has better cosmesis as compared to open appendectomy. Laparoscopic appendectomy is thus a safe, simple and efficient technique for treatment of acute appendicitis in experienced hands.

Laparoscopic approach enables appendectomy in cases with acute appendicitis with lesser morbidity and an earlier return to the normal activity and work.

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