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Original Research Article

A Randomized Prospective Comparative Study of Laparoscopic Appendicectomy versus Open Appendicectomy

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Conflict of interest: Nil

Abstract

Background: The study conducted at Darbangha Medical College & Hospital compared laparoscopic and open appendicectomy procedures for patients with acute appendicitis. A total of 144 patients were randomly selected for the study, which took place from November 2020 to August 2022.

Methods: Laparoscopic surgery has evolved as an effective tool for treating various diseases, offering advantages such as reduced abdominal wall stress, faster recovery, shorter hospital stays, and quicker return to regular activities.

Results: The study found that laparoscopic appendicectomy had a longer operation time than open surgery but did not provide superior immediate or long-term results in oncology. The average age for acute appendicitis was similar to previous studies, and the gender ratio of patients in the study was also comparable to other research. Regarding surgical outcomes, laparoscopic appendicectomy had a longer average procedure time but resulted in a shorter hospital stay compared to open appendicectomy. The conversion rate from laparoscopic to open surgery was slightly higher than the average reported in the literature. Laparoscopic surgery was associated with fewer wound infections but did not show a decrease in intra-abdominal abscesses. Patients in the laparoscopic group reported less post-operative pain, and laparoscopic appendicectomy was associated with better cosmesis. No cases of post-operative pneumonia or mortality were reported in either group.

Conclusion: The study concluded that laparoscopic appendicectomy is a safe and effective treatment with advantages such as reduced post-operative pain and improved cosmesis.

Keywords: Appendicitis, Perforation, open appendicectomy, laparoscopic appendicectomy, wound healing.

Introduction

The human vermiform appendix, often considered a vestigial organ with no known function, is actually a specialized part of the digestive tract. Research indicates that the appendix develops lymphoid tissue approximately two weeks after birth. When the appendix becomes inflamed, it is referred to as appendicitis [1]. Positioned on the posteromedial surface of the cecum, slightly lower than the cecal entry of the ileum, the vermiform appendix is a thin, worm-shaped protrusion. It is located within the outer tinea coli of the cecum, and its anterior tinea coli serves as a guide for identification. The appendix is invested with the muscularis propria, consisting of inner circumferential and outer longitudinal muscle layers. It is completely covered by the peritoneum [2].

Acute appendicitis is the most common reason for abdominal surgery in individuals of all ages [3]. Chronic appendicitis is characterized by chronic inflammatory changes in the appendix and is suspected to contribute to chronic recurrent abdominal pain, although the frequency of this occurrence is debated among surgeons. Perforation of the vermiform appendix can lead to localized periappendiceal abscess formation, appendiceal mass, or generalized peritonitis. The lifetime risk of appendicitis is higher in men, with 8.6% for men and 6.7% for women [3; 4]. Appendicitis perforation occurs more frequently in men (18%) compared to women (13%) [5]. The risk of perforation becomes significant 24 hours after the onset of appendicitis symptoms, but the timing can vary in different cases. There is a 20% chance of developing appendicitis within a day of experiencing initial symptoms [6].

The introduction of laparoscopy has brought significant changes to the field of surgery [7]. The initial description of laparoscopic appendicectomy was published by Semm [3]. Laparoscopic surgery has

gained popularity among surgeons due to its less invasive nature, although some remain skeptical about its use as a substitute for open appendicectomy [8]. Opponents of laparoscopic appendicectomy argue that the higher operating costs associated with disposable instruments make it less favorable. Additionally, laparoscopic appendicectomy has drawbacks such as longer recovery time and increased risk of intra-abdominal abscesses, particularly in cases of a ruptured appendix [9, 10]. Proponents of laparoscopic appendicectomy contend that the procedure promotes faster wound healing, reduces postoperative pain, and allows patients to leave the hospital and resume their normal activities sooner [8].

Furthermore, laparoscopy offers advantages such as smaller incisions, better visualization of the abdominal cavity, and secure examination [11]. Although several studies have statistically shown that laparoscopic surgery is associated with fewer complications, its efficacy and reliability in more complex cases, such as perforated appendix, remain uncertain [12]. This is due to the increased risk of intra-abdominal collection associated with laparoscopy. The effectiveness of laparoscopy versus laparotomy in treating perforated appendix lacks sufficient evidence from randomized perspective studies. Currently, laparoscopic surgery is recommended over open surgery as it allows for simultaneous diagnosis and removal of the appendix [13].

Randomized comparisons between open appendicectomy and laparoscopic appendicectomy have demonstrated that the latter is practical, safe, and improves diagnostic precision [14]. Patients benefit from reduced pain, fewer wound infections, faster recovery, and an earlier return to work [14, 15]. Laparoscopic appendicectomy has been deemed superior to open appendicectomy in terms of hospitalization duration, postoperative side effects, including pain and wound infections, complications like intra-abdominal abscess, cosmesis.

As a result, the main objective of this study is to evaluate and compare laparoscopic and open appendicectomy in routine surgical procedures.

The Darbangha Medical College & Hospital's General Surgery Department, located in Leheriasarai, Darbangha, conducted this prospective randomised controlled trial. Between November 2020 and August 2022, the study was conducted.

Material and Methods

Patients

The overall population group consisted of 144 patients, with a range in age from 18 to 60 years, and a mean age of 39 years. Patients between the ages of 18 and 60 were eligible for randomization. Patients with acute appendicitis are typically considered for appendicectomy. The selection criteria for laparoscopic versus open appendicectomy may depend on several factors such as the patient's age, medical history, the severity of the appendicitis, and the surgeon's preference. Patients who are pregnant, have severe obesity, or have other medical conditions that may complicate surgery may not be good candidates for laparoscopic appendicectomy. In contrast, open appendicectomy may be preferred for patients who have had previous abdominal surgeries or who have a very large appendix.

Data collection

To compare the results of laparoscopic versus open appendicectomy, patient data is routinely gathered. This information may include patient demographics, operating room time, hospital stay duration, postoperative problems, and lasting outcomes including the frequency of hernia formation and incisional discomfort. Both prospective and retrospective data collection methods are possible.

Design

An open randomised single centre study design was used to conduct the investigation.

A stratified random sampling approach was utilised for randomization. Each patient with an acute appendicitis who came at the OPD and was scheduled for surgery was given one of the numbers 1, 2, 3, and so on. In spite of sex or other co-morbid characteristics, every third and fourth number was chosen.

The selection criteria were age, which ranged from 18 to 60 years.

The plan was to perform an open appendicectomy every third patient and a lap appendicectomy every fourth patient. The surgical options, including laparoscopic and open appendicectomies, were thoroughly described to the patients.

As a result, the patients were not given the option to choose willingly the surgical treatment they wanted to have, which was likely the primary reason for the exclusion criteria.

Exclusion Criteria

Pregnancy severe cardiopulmonary disease, patient with generalised peritonitis were exclusion criteria.

Technique

- Both laparoscopic and open appendicectomy procedures were familiar to the involved physicians.
- Pre-operative shaving and the patient bathed on the night before operation.
- In the operating room, antibiotics were given 30 minutes prior to operation.

Surgical technique: Laparoscopic and open appendicectomy differs in the surgical technique used. In laparoscopic appendicectomy, small incisions are made in the abdomen, and a laparoscope and other instruments are inserted to visualize and remove the appendix. In contrast, open appendicectomy requires a larger incision in the abdomen to remove the appendix. The surgical technique used may depend on several factors, including the surgeon's training and experience, the patient's anatomy and medical history, and the severity of the appendicitis.

Position

- The patient is positioned supine. The anesthesiologist concealed the left arm with the pulse oximeter and blood pressure cuff at the patient's side while extending the right arm for intravenous access.
- The surgeon and the person who assisted with using the videoscope were able to move more easily as a result. The diathermy and suction irrigator were situated at the lower portion of the table, wherein the scrub nurse and Mayo instrument tray are situated, and the fiberoptic light cable and gas tubing were placed at the head of the table. The video monitor was positioned across from the operating team.

Anaesthesia

- General anesthesia with placement of an endotracheal tube was preferred.
- After induction, sometimes when required a nasogastric tube was placed by the anesthesiologist. The tube was removed before the end of the case.

Statistical Analysis

The effectiveness of laparoscopic versus open appendicectomy operations is compared by data analysis using the appropriate statistical techniques. Using a chi-squared test, for instance, one may compare the incidence of postoperative problems while using a t-test to compare the mean operational duration and duration of the hospitalisation. A meta-analysis may also be performed to compare the results of multiple studies.

Ethical Considerations

Ethical considerations must be taken into account when conducting research on laparoscopic versus open appendicectomy. Patients must provide informed consent for the procedure and for the use of their data for research purposes. Additionally, patients must be given the chance to ask queries to help them make wise choices about their treatment after being made aware of the risks and advantages of each surgery.

Discussion

This prospective comparative study was conducted at the Department of Surgery in Darbangha Medical College & Hospital. The study aimed to evaluate and compare laparoscopic and open appendicectomy procedures. The study period lasted from November 2020 to August 2022, during which 144 patients suspected of having appendicitis were included.

All 144 patients were part of the study group, with 72 patients randomly assigned to undergo laparoscopic surgery and 72 patients assigned to open appendicectomy. However, five patients in the laparoscopic group had to undergo open surgery due to difficulties in identifying anatomy and dissection caused by previous abdominal procedures.
In one case of laparoscopy, significant hemorrhage occurred, and in another case, caecal perforation was observed, leading to the decision for an open right hemicolectomy. Additionally, four laparoscopic cases revealed a non-inflamed appendix.
Among the 72 patients assigned to open appendicectomy, 16 individuals had their non-inflamed appendix removed, while three cases involved conservatively leaving the appendix in situ. Furthermore, one patient underwent laparoscopic appendicectomy to compare its benefits with the traditional open approach.

Post – operative morbidity

Wound infections

In comparison to participants randomised to open appendicectomy, patients who had laparoscopy experienced considerably lower rates of wound infections. Twenty patients who undergo open appendicectomy had wound infections during the healing process. All of these individuals belonged to the category of those who had perforated or gangrenous appendicitis. The laparoscopic group included 6 individuals who had wound infections.

Table 1: Study population of wound infections in Laparoscopic Appendicectomy and Open Appendicectomy

Wound infection	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Number	Percent	Number	Percent
Male	6	8.333333	11	15.27778
Female	0	0	9	12.5
Total	6	8.333333	20	27.77778
P Value	0.123 (Chi square) not significant			

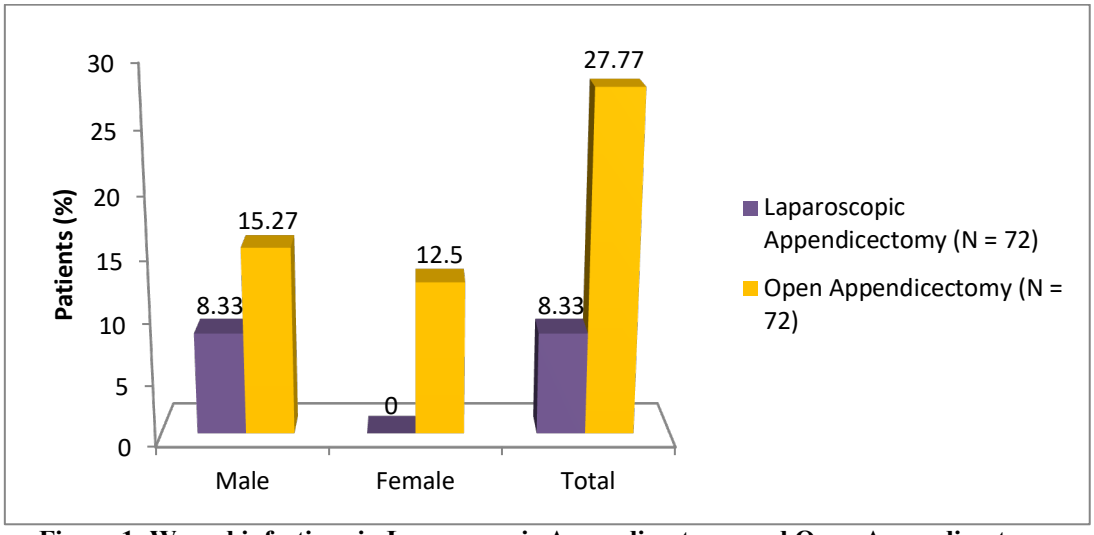

Figure 1: Wound infections in Laparoscopic Appendicectomy and Open Appendicectomy

Intra – Abdominal Abscess

After laparoscopic appendicectomy, there were 8 cases and after open surgery, there were 2 cases of intra-abdominal collection. Following surgery, two patients continued to have fever, while a third patient—who had been released on day 4—presented with local symptoms on day eight. Each patient lacked a mass. However, ultrasonography in each instance showed a pericaecal fluid accumulation, the largest of which measured 2 cm by 4 cm. Two patients had needle aspiration therapy, while one patient received conservative care. Follow-up ultrasonography was used in every case to confirm resolution.

One patient who underwent an open appendicectomy got a pelvic abscess. Transvaginal aspiration and drainage with the aid of ultrasound guided the successful treatment of this.

Table 2: Study population with intra – abdominal collection in Laparoscopic Appendicectomy and Open Appendicectomy

Intra-abdominal abscess	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Number	Percent	Number	Percent
Male	2	2.777778	1	1.388889
Female	6	8.333333	1	1.388889
Total	8	11.11111	2	2.777778
P Value	P < 0.05 (Significant)			

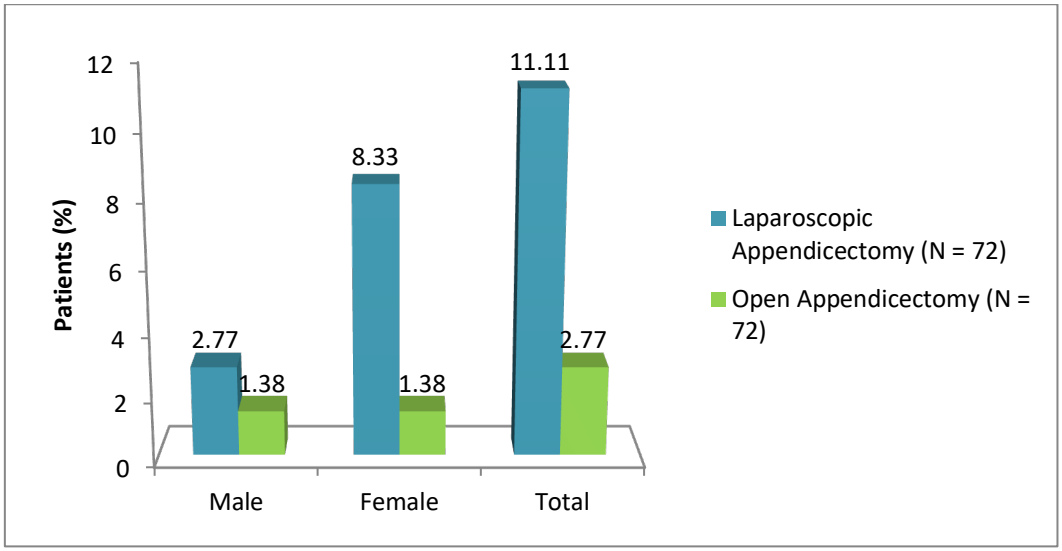

Figure 2: Intra – abdominal collection in Laparoscopic Appendicectomy and Open Appendicectomy

Caecal leak

During the study, one patient who underwent laparoscopic appendicectomy developed a Caecal leak that required conversion and subsequent Right hemicolectomy, while there were no cases of Caecal leak associated with the open appendicectomy procedure.

Table 3: Study population with Caecal leak in Laparoscopic Appendicectomy and Open Appendicectomy

Caccal leak	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Number	Percent	Number	Percent
Male	1	1.388889	0	0
Female	0	0	0	0
Total	1	1.388889	0	0
P Value	P > 0.05 (Not significant)			

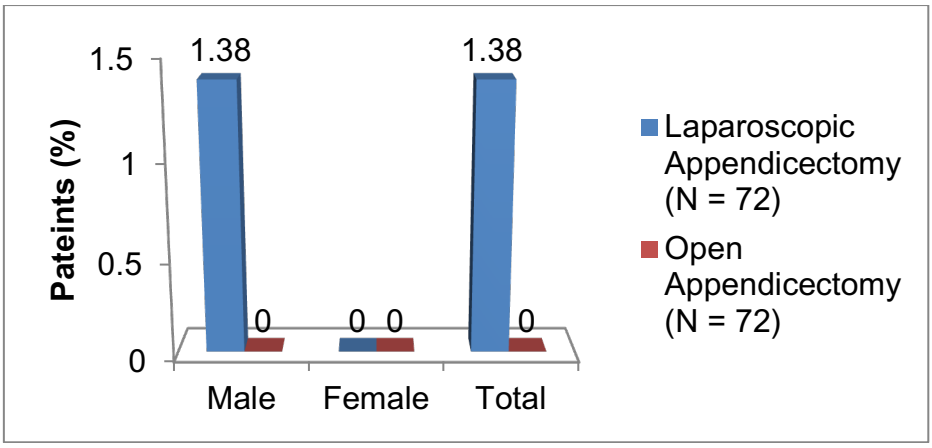

Figure 3: Caecal leak in Laparoscopic Appendicectomy and Open Appendicectomy

Operating time

Patients who were randomly assigned to have an open appendicectomy had a considerably shorter operating time (43 minutes vs 60 minutes) than those who had a laparoscopic appendicectomy. Laparoscopic and open appendicectomies each took a minimum of 15 and 30 minutes to complete, respectively. Similar to this, the longest reported operations for open and laparoscopic appendicectomies, respectively, were 100 and 60 minutes.

Table 4: Study population operating time in Laparoscopic Appendicectomy and Open Appendicectomy

Operating time	Laparoscopic Appendicectomy (N = 72)	Open Appendicectomy (N = 72)
Min Time (Mins)	15	30
Max Time (Mins)	100	60
Average (Mins)	60.2	43.26

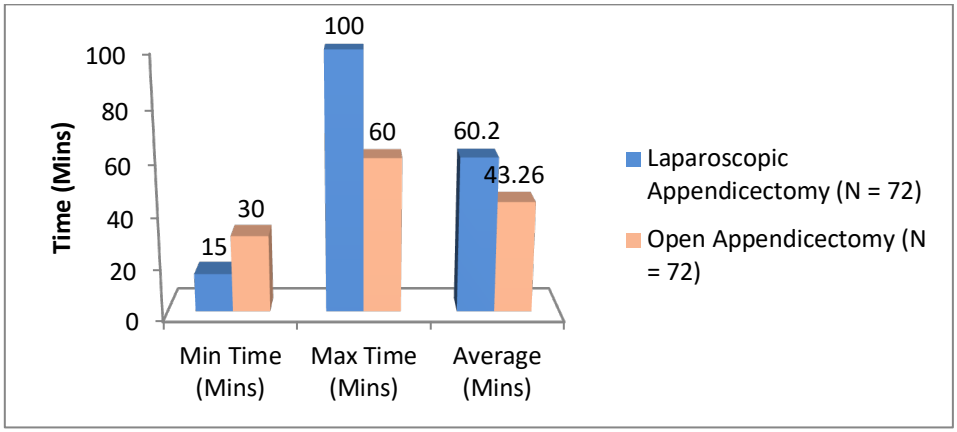

Figure 4: Operating time in Laparoscopic Appendicectomy and Open Appendicectomy

Convalescence

In comparison to the open procedure group, the laparoscopic group's recovery time was noticeably quicker. The mean for normal activity in Laparoscopic Appendicectomy and Open Appendicectomy recorded were 5.5 and 7.62 respectively. Similarly, the mean for heavy work in Laparoscopic Appendicectomy and Open Appendicectomy recorded were 11.9 and 17.04 respectively.

Table 5: Convalescence of normal activity and heavy work with study population of Laparoscopic Appendicectomy and Open Appendicectomy

Convalescence	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)		P value
	Mean	Median	Mean	Median	
Normal activity	5.51	5	7.62	7	< 0.001
Heavy work	11.9	12	17.04	17	< 0.001

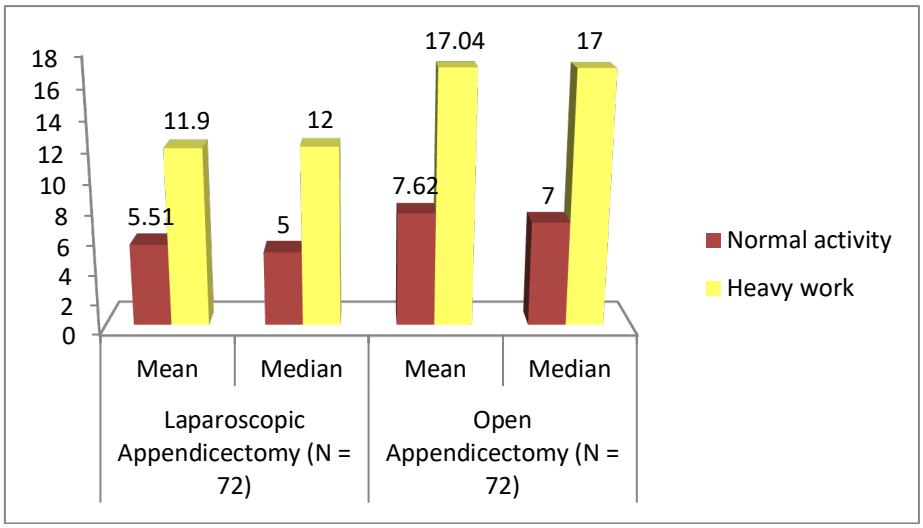

Figure 6: Normal activity and heavy work with study population of Laparoscopic Appendicectomy and Open Appendicectomy

Cosmesis

Both groups performed well as measured using a visual analogue scale, although patients who were randomly assigned to laparoscopy were better with the cosmesis outcome. While the laparoscopic group scored 1.15, the open group scored higher of 2.3.

Table 7: Study population Cosmesis in Laparoscopic Appendicectomy and Open Appendicectomy

	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Average	Range	Average	Range
Male	1.15	0 - 3	2.17	1 - 8
Female	1.15	0 - 3	2.43	1 - 8
Total	1.15	0 - 3	2.3	1 - 8
P value	< 0.001 (significant)			

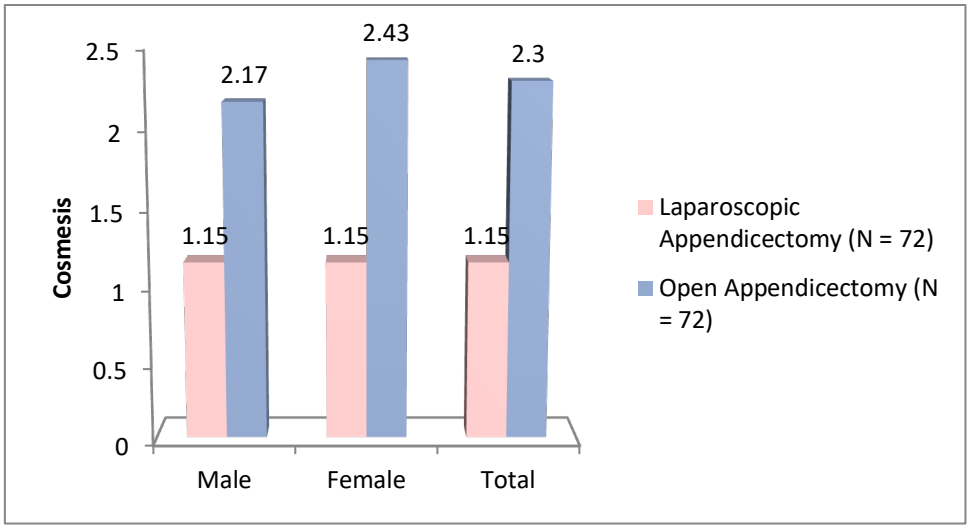

Figure 5.8: Cosmesis in Laparoscopic Appendicectomy and Open Appendicectomy

Pain

After 12 hours, there was not much of a difference in the minimal clinically significant difference on a VAS. following surgery, the laparoscopic appendicectomy median value (MCSD) was 12.77. Additionally, the open appendicectomy's average value (MCSD) was 13.75 ($P > 0.05$). However, 24 hours following the operation, there was a difference in the level of pain.

In the first 24 hours following surgery, neither group required any more pethidine (1 mg/kg) than the other, although patients receiving laparoscopic appendicectomy required fewer doses of oral analgesics.

Table 5.9: Pain according to VAS scale Laparoscopic Appendicectomy and Open Appendicectomy

	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)		P value
	Average	Range	Average	Range	
Pain after 12 hours (MCSD)	12.77	09:16	13.75	10:20	0.601
Pain after 24 hours (MCSD)	15.16	05:25	16.09	05:40	0.284

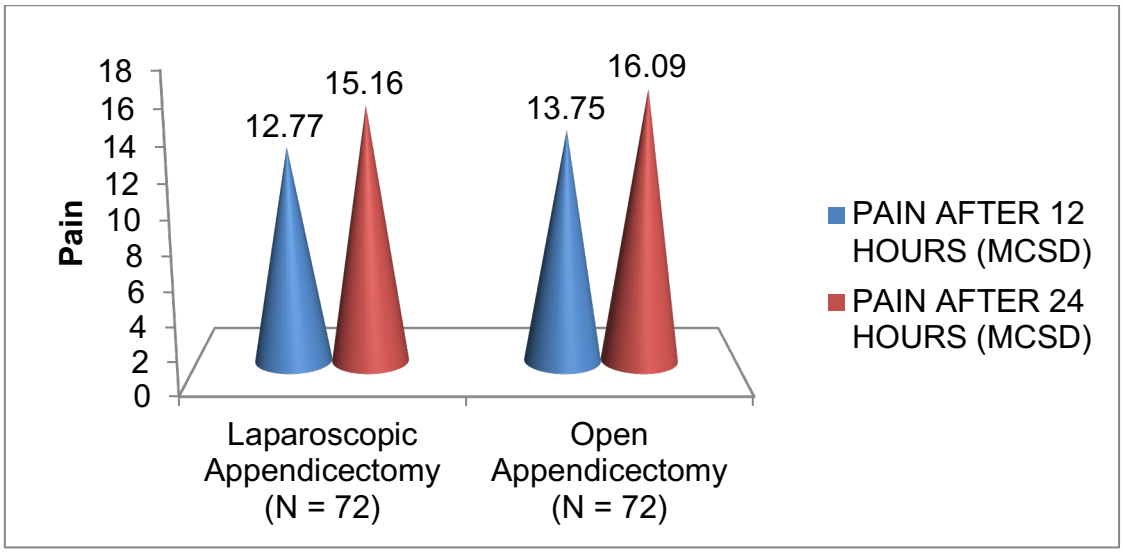

Figure 5.9: Pain according to VAS scale Laparoscopic Appendicectomy and Open Appendicectomy

Hospital Stay

In contrast to the median hospital stay following an open appendectomy, which was 5, the median hospital stay following a laparoscopic appendectomy was 4. Therefore, recovery following laparoscopic surgery was quicker than recovery from open surgery, and patients were discharged from the hospital sooner ($P < 0.001$)

Table 5.10: Hospital stay after laparoscopic Appendicectomy and open Appendicectomy.

	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)		P value
Hospital stay	**Average**	**Range**	**Average**	**Range**	
Male	3.97	2 - 8	5.82	3 - 10	< 0.001
Female	3.96	3 - 7	6.46	3 - 10	
Total	3.97	2 - 8	6.05	3 - 10	

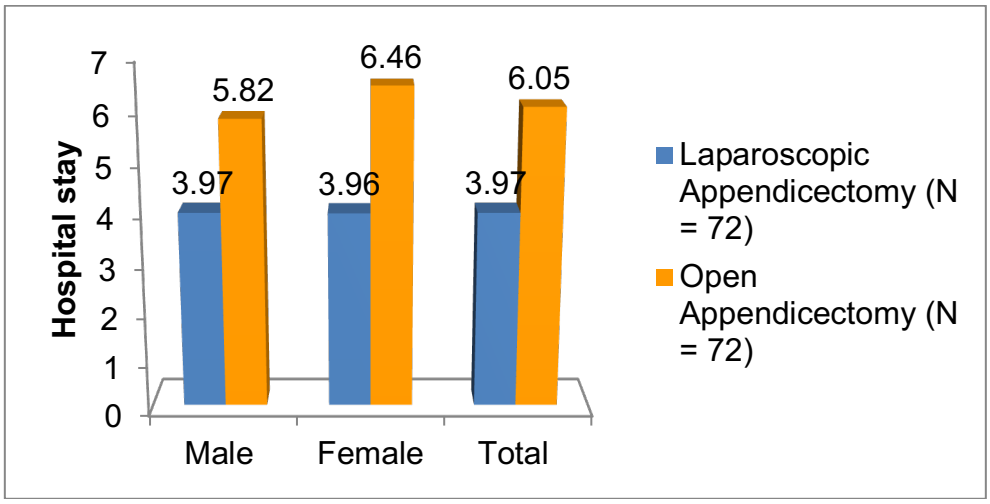

Figure 5.10: Hospital stay after laparoscopic Appendicectomy and open Appendicectomy.

Adhesive ileus

Laparoscopic appendicectomy resulted in six cases of adhesive ileus, and open appendicectomy resulted in one case ($p < 0.05$). It was observed that adhesive ileus after open appendicectomy and laparoscopic appendicectomy were only found in female patients and no male patients were associated with adhesive ileus after the completion of the procedure.

Table 11: Adhesive ileus after laparoscopic appendicectomy and open appendicectomy

Adhesive ileus	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Number	**Percent**	**Number**	**Percent**
Male	0	0	0	0
Female	6	8.333333	1	1.388889
Total	6	8.333333	1	1.388889
P Value	0.05 (Significant)			

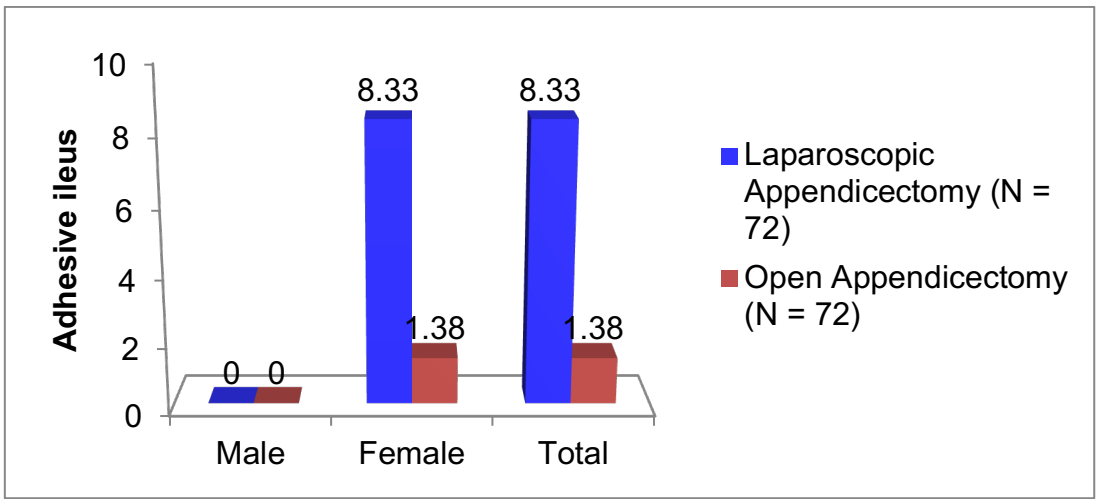

Figure 11: Adhesive ileus after laparoscopic appendicectomy and open appendicectomy

Pneumonia

However, there were no occurrences of pneumonia recorded during the recovery time from surgery.

Mortality

Deaths reports were not present in the study. After five days from the day of release for all patients, or earlier in an emergency, as directed, in the OPD.

Demographic profile of the patients

The study found that both males and females between the ages of 18 and 30 had the highest number of laparoscopic appendicectomy cases, totaling 36 (50%).

Similar to this, both males and females between the ages of 18 and 30 had the largest number of laparoscopic appendicectomy cases. While in both surgery groups, the age range of patients over 50 years old had the lowest proportion of patients.

Table 12: Age range of population study for laparoscopic appendicectomy and open appendicectomy

Age range	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Number	Percent	Number	Percent
18 - 30	36	50	40	55.55556
31 - 50	25	34.72222	27	37.5
50 +	11	15.27778	5	6.944444
Total	72	100	72	100
Average	34.52		31.81	

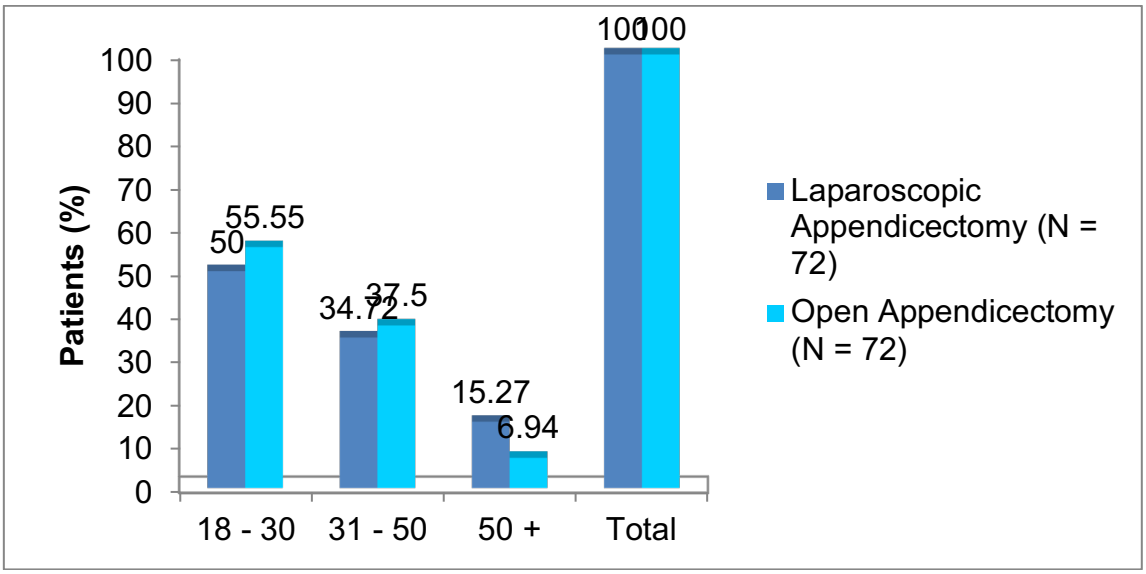

Figure 5.12: Age range of both procedure patients

Table 13: Gender ratio of population study for laparoscopic appendicectomy and open appendicectomy

Gender ratio	Laparoscopic Appendicectomy (N = 72)		Open Appendicectomy (N = 72)	
	Number	Percent	Number	Percent
Male	40	55.55556	46	63.88889
Female	32	44.44444	26	36.11111
Total	72	100	72	100

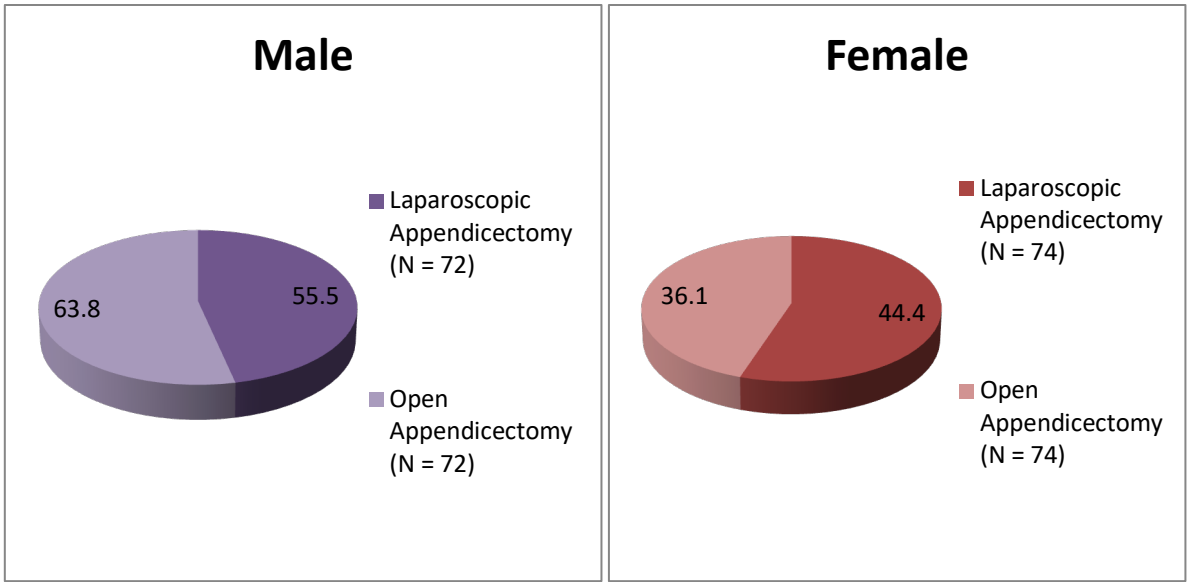

Figure 13: Gender ratio of male and female for both procedure groups

Population group: 144

Study group – 144
A. Lap appendicectomy – 72
B. Open appendicectomy – 72

Table 5.14: Different scales of parameters in laparoscopic appendicectomy and open appendicectomy

Randomized	Laparoscopic Appendi-cectomy (n=72)	Open Appendicectomy (n=72)	Probability value
1. Operation Time	60.2 (15 –100) minutes	43.26 (30 –60) minutes	< 0.001
Post – Operative Morbidity	Nil	Nil	Nil
A) Wound Infection	6	20	< 0.123
B) Intra –Abdominal Abscess	8	2	< 0.05
C) Caecal Leak	1	0	P > 0.05
D) Adhesive Ileus	6	1	< 0.05
E) Pneumonia	0	0	Non-significant
3. Cosmesis (VAS)	1.15 (0 –3)	2.3 (1 –8)	< 0.001
4. Pain (VAS)			
A) After 12 Hours	12.77 (MCSD) (9 – 16)	13.75 (MCSD) (10-20)	> 0.601
B) After 24 Hours	15.16 (5 – 25)	16.09 (5 – 40)	> 0.284

Table 15: Duration of the stay, activities and mortality rate of both groups

Randomized	Laparoscopic Appendi-cectomy (Days)	Open Appendicectomy (Days)	Probability Value
Hospital Stay	3.97 (2 –8)	6.05 (3 –10)	<0.001
Convalescence	5.51 (4 –14)	7.62 (2 – 10)	< 0.001
Normal Activity Heavy Work	11.9 (10 – 27)	17.04 (2 – 20)	< 0.001
Mortality	0	0	0

The following tests were used: Mann-Whitney Utest, χ^2 CHI-SQUARE TEST, and MCSD (Minimum Clinically Significant Difference).

Pathology of the Appendix

The pathology of the appendix was compared to histological studies based on gross appearance observed during surgery is divided into two categories, namely open appendicectomy and laparoscopic appendicectomy.

Table 16: Pathology of open appendicectomy and laparoscopic Appendicectomy

Types	Laparoscopic Appendicectomy n = 72		Open Appendicectomy n = 72	
	Present	Absent	Present	Absent
1. Phlegmonous	36	36	23	49
2. Gangrenous	16	56	19	53
3. Perforated	10	62	15	57

It was discovered that a significant portion of individuals with acute appendicitis received laparoscopic appendicectomy.

Discussion

At the Department of General Surgery in Darbangha Medical College & Hospital, a study was conducted to compare laparoscopic and open appendicectomy procedures for patients with suspected acute appendicitis. The study included a total of 144 randomly selected patients who underwent either emergency or outpatient surgery from November 2020 to August 2022.

Laparoscopic surgery has evolved and become a powerful tool for treating both benign and malignant diseases. It offers advantages such as reduced stress on the abdominal wall, quicker recovery, shorter hospital stays, and faster return to regular activity. Procedures like cholecystectomy, fundoplication, and adrenalectomy have already demonstrated the effectiveness of laparoscopic surgery with minimal incisions and lower postoperative complications.

Although there is a lack of randomized controlled studies supporting laparoscopic techniques, they are still considered the gold standard for surgical intervention. Laparoscopic procedures may take longer than open surgery initially, but with experience and learning, the duration has decreased over time. There is no evidence to suggest that open surgery produces better immediate or long-term results in oncology compared to laparoscopic surgery.

Age incidence

The average age for acute appendicitis in the current study was reported to be 34.52 years for laparoscopic procedures and 31.81 years for open group procedures. The Guller and Harvey study, which relied on the discharge reports of 43,757 individuals from local hospitals in the US, was shown to be comparable to this. In their investigation, the median age for acute appendicitis was found to be 31 years [16].

Gender ratio

Male patients comprised 55.5% and 63.8% of the 144 participants in the current study, respectively, for the laparoscopic and open group procedures. Female patients comprised 36.1% of open group operation patients and 44.4% of laparoscopic group procedure patients, respectively. It was discovered that there were 58 women and 86 men overall among the study group's patients. It was discovered that this study and the one conducted by Oguntola and Adeoti in 2010 [17] at the Lautech Teaching Hospital and Abake Medical Centre in Nigeria were equivalent. It was also discovered that this study, which contained 52% of the total participants, was comparable to the comparison study of laparoscopic vs. open appendecectomy performed by Eular M. Azaro and Paulo 1999 [18] Amaral in Sao Rafael Hospital, Salvador.

Operation Time

The average procedure time in the current study in minutes was determined to be 60.2 for laparoscopic appendectomies and 43.26 for open appendectomies. This was discovered to be comparable to the Lin et al. study. It takes longer to execute a laparoscopic appendicectomy than an open appendicectomy (96.1 43.1 minutes vs. 67.8 32.2 minutes), according to [13] [14] [15]. Additional research suggests that a laparoscopic appendicectomy takes longer to complete than an open appendicectomy [17–18]. These outcomes were comparable to ours.

In terms of the variable "surgery duration," McAnena et al. and Schroder et al. demonstrated that there is no difference of statistical significance among the time frame of videolaparoscopic appendicectomy and appendicectomy conducted via open surgery. A laparoscopic operation took 61 minutes on average to complete compared to 51 minutes on average for an open procedure, according to Attwood et al's study. Our results showed that a disadvantage of laparoscopic surgery is its longer operating time, with traditional surgery taking only 59 minutes as opposed to 84.4 minutes for videolaparoscopy. Trocar orifices cause less tissue stress than incisions made with muscle division, which may minimise postoperative pain. [19]. This is supported by research in the literature.

Hospital stay

The average hospital stay following laparoscopic or open surgery is 2 to 5 days, according to most research. Nevertheless, some recent retrospective cohort studies or record reviews discovered a considerable reduction in hospital stay following laparoscopic appendicectomy. Other retrospective studies revealed no difference that was statistically significant. Laparoscopic appendicectomy has also been linked in some randomised controlled trials to shorter hospital stays. Others claim there is little to no difference between laparoscopic and open ap-

pendicectomies. Even metanalyses present contentious conclusions.

Out of a total of 72 patients from both groups who were selected for this study, it was discovered that the average time spent in the post-operative ward was 3.97 days for laparoscopic appendectomies and 6.05 days for open appendectomies. It was discovered that this was statistically significant. It was discovered that this study and the one carried out by Edvaldo Fahel in 1999 [20] in Sao Rafael Hospital, Salvador, were equivalent. It was statistically significant that the two values were different, Laparoscopic appendicectomy patients spent an average of 3.9 days in the hospital, whereas open appendicectomy patients stayed an average of 6.05 days.

According to our research, laparoscopic appendicectomy patients often had a less extended hospital stay (3.9 days). Numerous research revealed conclusions that were comparable [21-25, 11].

Conversion to open

Laparoscopic appendicectomy to laparotomy conversion rates have been on average 6.75%. Numerous studies demonstrated average conversion rates of 7%, 13.5%, and 15% [23-26]. When these conversions were carried out, there were appendiceal perforations, perforations with retrocecal appendix, faecal soilage, unknown anatomy, the presence of plastron, abscess, and intraoperative bleeding. Our conversion rate, which was 6.75 percent, was marginally higher than the literature's average. It has been shown that the conversion rate is declining as laparoscopic experience increases.

Post operative healing.

Our findings also indicated that wound infections are a less common postoperative complication in patients undergoing laparoscopic surgery than they are in patients undergoing open surgery. Additionally, it should be noted that infections are substantially less common since the abdominal wall is not contaminated [27]. On the other hand, individuals who undergone laparoscopic appendicectomy did not see a reduction in intra-abdominal abscesses, according to Richards et al 1993 [28]. Laparoscopic appendectomy for appendicitis with perforation has been associated with an increase in abscess formation, according to multiple research. When comparing patients who underwent open appendicectomy (14.8%) to those who underwent laparoscopic appendicectomy (4.4%), we found that the incidence of infections of wounds has decreased statistically significantly.

Pain

Post-operative pain was assessed in the current study at 12 and 24 hours after surgery, and it was found that the open group felt more pain than the laparoscopic group did. In the immediate postoperative period, both patients got opiate analgesic therapy. The postoperative pain was assessed using a visual analogue scale (VAS) and demonstrated to be decreased in the laparoscopic group with the same dose of parenteral analgesics supplied per kg of body mass as in the open appendicectomy group. The opposite was discovered in none of the methods used to assess post-operative discomfort. In a subgroup of 135 participants in the Ortega et al. trial, linear analogue pain ratings were measured. At 24 and 48 hours, pain scores were much reduced. Similar retrospective research using a VAS to quantify pain during post-operative establishes no significant differences in pain scores between open and laparoscopic appendicectomy [29].

Adhesive ileus and cosmesis

In the current study, it was discovered that there were more sticky ileus following laparoscopic appendicectomy following open appendicectomy [30] (P 0.05). Band blockage was identified as the primary factor. After an open appendicectomy, the adherent ileus might be treated medically without surgery. Intestinal obstruction, an adhesion-related complication, continues to be the leading cause of long-term morbidity following open appendicectomy. Laparoscopy, in accordance with Pedersen AG, was linked to better cosmesis ($P<0.001$) [15]. On a scale from excellent (zero) to poor (ten), the patient rated his or her cosmesis. The laparoscopy treatment, according to another study [31], leaves a little scar that is more attractive and acceptable. When compared to open appendicectomy in the current study, laparoscopic appendicectomy was linked to enhanced cosmesis ($P = 0.001$).

Pneumonia and mortality

Although being listed as one of the criteria for complications, neither the laparoscopic nor the open appendicectomy groups reported any instances of post-operative pneumonia. In contrast, there was not a single episode of pneumonia documented during the healing process. With less morbidity, laparoscopic appendicectomy is a safe treatment that also has a shorter recovery time than open appendicectomy. It also makes a great training tool for laparoscopic technique.[32] Death, or mortality, was not mentioned in the study. After five days had passed since the day they were discharged, or sooner if necessary for any emergency, all patients followed up in the OPD as instructed.

Conclusion

The number of days spent in the post-operative ward, the quantity of analgesics administered during the post-operative time frame, and the length of the procedure in minutes was observed as the main results of the variables in the current contrasting research, that took place on 144 patients. We have demonstrated the safety of laparoscopic appendi-

cectomy as a treatment for acute appendicitis. Additionally, it provides benefits like a shorter stay in the hospital, less mortality, and a decreased incidence of intestinal infections. Laparoscopy is increasingly being used as the first line of treatment for acute appendicitis, according to recent studies. As a result, challenges like longer operation times, higher costs, and technical limitations must be solved. Laparoscopic appendicectomy was found to be a superior surgical technique than open appendicectomy when primary outcomes were taken into consideration.

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