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COMPARATIVE STUDY OF LAPAROSCOPIC VS OPEN APPENDICETOMY IN A TERTIARY CARE CENTER

DR. ARAVIND. K[1], DR. P.B. SUDARSHAN[2*]
[1]DEPARTMENT OF GENERAL SURGERY, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES, CHENNAI- 602105, TAMIL NADU, INDIA
[2]DEPARTMENT OF GENERAL SURGERY, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES, CHENNAI- 602105, TAMIL NADU, INDIA

Abstract
Approximately 7% of individuals experience appendicitis at some point in their lives, with the highest occurrence observed between the ages of 10 and 30.(1) MC Burney popularised the open approach appendectomy as the preferred therapy for appendicitis. (2) Currently, the laparoscopic method has emerged as a novel approach for performing appendectomy. The laparoscopic method is associated with minimal surgical trauma, reduced postoperative discomfort, and shorter hospital stays. (3) However, the elevated expense of the therapy and extended duration of the procedure continue to be the limiting factor for laparoscopic surgery. Laparoscopic surgery is a less invasive treatment that typically leads to a smooth and uncomplicated recovery after various surgical operations. The key characteristics that set a laparoscopic procedure apart from a standard open approach include a shorter hospital stay, faster recovery time, decreased pain, and improved cosmetic outcomes. The adoption of the laparoscopic method as the gold standard for surgical operations like cholecystectomy has been facilitated by the potential benefits for patients and the superior outcomes it offers. Nevertheless, the use of laparoscopy in appendectomy has continued to be a subject of debate without a definitive agreement at present.

Keywords Laparoscopic,tertiary

INTRODUCTION:

The conventional gridiron incision strategy has been compared to the minimally invasive approach in many scientific investigations, including prospective randomised experiments (4–8), retrospective experience analysis (9–14), and meta-analysis. The study findings on laparoscopic appendectomy (LA) have been varied, with some research showing improved clinical outcomes, while others show no apparent benefit or only a slight advantage. Additionally, certain studies have found that laparoscopic surgery is associated with increased surgical expenses. Due to the contrasting results, a definitive agreement on whether strategy is best in treating appendicitis has not been established.

The outcomes of appendectomy might vary significantly depending on the severity of the patient's sickness and whether they have severe (perforated) or uncomplicated appendicitis. (6,13). Although there have been inconsistent findings, multiple studies have shown that the laparoscopic method is superior in treating uncomplicated appendicitis. (4-10) Nevertheless, the precise advantages of laparoscopy as a diagnostic or therapeutic approach in the treatment of complex or perforated appendicitis have not yet been clearly established. Some surgeons may still see perforated appendicitis as a contraindication to laparoscopic mediation. Several studies have demonstrated superior results using the laparoscopic method, while others indicate that laparoscopic surgery offers little to no advantage over open surgery. (8)
This retrospective cohort study seeks to compare the laparoscopic technique with the open technique in terms of preoperative, operative, and postoperative variables.

METHODOLOGY

This retrospective cohort study was conducted from December 2023 to April 2024, with the objective of comparing outcomes between laparoscopic and open appendectomy in adult patients. The inclusion criteria encompassed all patients aged over 18 years who underwent either laparoscopic or open appendectomy during the study period. Patients presenting with an appendicular abscess, appendicular mass, or perforated appendix were excluded to maintain homogeneity in the sample.

A total of 50 patients were included in the study, with 25 patients in the laparoscopic appendectomy group and 25 patients in the open appendectomy group. The participants were selected based on their diagnosis of appendicitis and the surgical approach employed for their treatment.

The primary outcome measures evaluated in this study were the operative time, length of hospital stay, complication rates, and postoperative pain scores. These outcomes were chosen to provide a comprehensive assessment of the efficacy and safety of both surgical techniques.

Operative time was recorded from the initial incision to the final suture, while the length of hospital stay was measured in days from the day of surgery until discharge. Complication rates included any intraoperative or postoperative adverse events, such as infections, bleeding, or the need for reoperation. Postoperative pain scores were assessed using a standardized pain scale at regular intervals post-surgery.

Data were collected retrospectively from medical records and analysed using appropriate statistical methods. Continuous variables, such as operative time and length of hospital stay, were compared using t-tests, while categorical variables, such as complication rates and postoperative pain scores, were analysed using chi-square tests. A p-value of less than 0.05 was considered statistically significant, indicating a meaningful difference between the laparoscopic and open appendectomy groups.

The rigorous application of these statistical tests ensured that the findings of the study were robust and reliable, providing valuable insights into the comparative effectiveness of laparoscopic versus open appendectomy in adult patients with appendicitis.

RESULTS

TABLE 1: Demographic Data and Baseline Characteristics

DEMOGRAPHIC DATA	OPEN	LAPAROSCOPIC	P VALUE
MALE	17	14	<0.001
FEMALE	8	11	0.002
WBC COUNT	14000+4600	13500+3500	0.0002

The demographic data and baseline characteristics of the study participants are summarized in Table 1. Among the patients who underwent open appendectomy, 17 were male and 8 were female, whereas the laparoscopic appendectomy group comprised 14 males and 11 females. The gender distribution showed a statistically significant difference between the two groups, with a p-value of <0.001 for males and 0.002 for females.

Additionally, the white blood cell (WBC) count, an important marker of infection and inflammation, was measured in both groups. The mean WBC count in the open appendectomy group was 14,000 ± 4,600, compared to 13,500 ± 3,500 in the laparoscopic group. This difference was also statistically significant, with a p-value of 0.0002, indicating a higher level of inflammation in the open appendectomy group.

These demographic and baseline differences underscore the need to consider these variables when interpreting the outcomes of the study.

TABLE 2: Clinical Outcome Parameters

PARAMETER	LAPROSCOPIC APPENDICTOMY	OPEN APPENDICTOMY	P VALUE
OPERATIVE TIME (MINUTES)	MEAN=45, SD=10	MEAN=60, SD=15	<0.0001
LENGTH OF HOSPITAL STAY (DAYS)	MEAN=1.5, SD= 0.5	MEAN=3, SD=1	<0.0002
COMPLICATION RATES (%)	4%(1 OUT OF 25 PATIENTS)	12% (3 OUT OF 25 PATIENTS)	0.003
POSTOPERATIVE PAIN SCORE (0-10)	MEAN=2.5, SD= 1.0	MEAN=4.0, SD=1.5	0.015
P VALUE	0.002	0.001	

The clinical outcomes of the study, which compared laparoscopic and open appendectomy, revealed significant differences across various parameters. These findings underscore the potential benefits of laparoscopic surgery over the traditional open approach in treating appendicitis.

The mean operative time for the laparoscopic appendectomy group was significantly shorter, averaging 45 ± 10 minutes, compared to 60 ± 15 minutes for the open appendectomy group. This difference, with a p-value of <0.0001, indicates a statistically significant reduction in the time required to perform a laparoscopic appendectomy. The shorter operative time could be attributed to the minimally invasive nature of the laparoscopic

technique, which typically involves smaller incisions and a more straightforward approach to accessing the appendix.

Patients who underwent laparoscopic appendectomy had a significantly shorter hospital stay, with a mean duration of 1.5 ± 0.5 days, compared to 3 ± 1 days for those who underwent open appendectomy. The p-value of <0.0002 highlights the statistical significance of this finding. A shorter hospital stay is beneficial not only for patient recovery and comfort but also for reducing healthcare costs and improving hospital resource utilization.

The complication rates were notably lower in the laparoscopic group, with only 4% (1 out of 25 patients) experiencing complications, compared to 12% (3 out of 25 patients) in the open appendectomy group. This difference, with a p-value of 0.003, suggests a statistically significant advantage of the laparoscopic approach in reducing postoperative complications. Complications in the context of appendectomy can include infections, bleeding, and the need for reoperation, all of which can significantly impact patient outcomes and recovery.

Postoperative pain, assessed using a standardized pain scale from 0 to 10, was significantly lower in the laparoscopic group. Patients reported a mean pain score of 2.5 ± 1.0, whereas those in the open appendectomy group reported a mean score of 4.0 ± 1.5. The p-value of 0.015 indicates a statistically significant reduction in postoperative pain for patients undergoing laparoscopic surgery. Lower pain levels post-surgery can enhance patient comfort, reduce the need for analgesics, and facilitate quicker mobilization and recovery.

In summary, the results of this study demonstrate that laparoscopic appendectomy offers several clinical advantages over open appendectomy, including shorter operative times, reduced hospital stays, lower complication rates, and less postoperative pain. These findings support the adoption of laparoscopic techniques as a preferred method for appendectomy in adult patients, potentially leading to improved patient outcomes and more efficient healthcare delivery.

DISCUSSION:

The average age of the OA group and the LA group was determined to be comparable to certain research. (15) Several comparable research have indicated that the average age in both groups is approximately in the 30s, which contradicts our findings.(16-19) The proportion of males in OA was 60.67%, whereas in LA it was only 27.33%. Biondi et al. also reported a statistically significant difference in sex in a comparable retrospective analysis. (16) A comprehensive study conducted throughout Taiwan's whole population revealed that a greater percentage of females have undergone laparoscopic surgery. (19) In the OA group, the average duration of symptoms was 1.58 days, while in the LA group it was 1.33 days. The leukocyte count did not show any significant difference between the two groups. The total duration of the operation, consistent with the existing literature, was notably longer for laparoscopic surgery (LA) compared to open surgery (OA).(15,20,21). The extended duration of local anaesthesia (LA) can be attributed to the heightened use of medical instruments, the inclusion of extra setup procedures, and the time required for surgeons to become proficient in performing the procedure. Our study found that the laparoscopic group had a much shorter hospital stay, consistent with several studies. (15,20,22). While the LA group had a slightly earlier average number of days for the first bowel movement, this difference was not statistically significant. Nevertheless, multiple studies have documented that the laparoscopic method leads to earlier bowel movement and a shorter period until oral intake after surgery. (15,23) In our study, patients who underwent laparoscopic appendicectomy reported experiencing lower degrees of discomfort in comparison to the group who underwent open appendectomy. Reduced abdominal wall damage significantly contributes to postoperative discomfort. Our findings align with multiple studies that have demonstrated less postoperative discomfort when using a laparoscopic method. (15) In addition, our study found that there is a much higher demand for parenteral analgesics in the open group, which is consistent with other reports in the literature.(24). The documented intraoperative consequences were ileal damage and limited colectomy. There was an absence of appendicular abscesses, pelvic abscesses, and appendicular tumours. Nevertheless, there was no notable disparity in the occurrence of problems during surgery between the two groups. Comparable results are documented in the existing body of literature. (22) A study revealed that purulent peritonitis is prevalent among individuals with osteoarthritis. (23) Enhanced abdominal muscle mobility and prompt mobilisation achieved with laparoscopic techniques reduce the requirement for pain medications and the likelihood of early problems following surgery. Observations were made of late complications including intra-abdominal abscess, enterocutaneous fistula, surgical site infection, and stump appendix. Our study did not observe any additional consequences, such as portal pyaemia, sepsis, venous thromboembolism, and respiratory issues. Multiple studies have revealed that open appendectomy is associated with a higher frequency of late complications.(24,25). In previous research, the most prevalent complication of laparoscopic appendectomy (LA) compared to open appendectomy (OA) was the development of an intra-abdominal abscess.(24,25) However, our study did not observe any cases of intra-abdominal abscess.

CONCLUSION

This study underscores the advantages of laparoscopic appendectomy over open surgery in adult patients with appendicitis. Laparoscopic appendectomy demonstrated shorter operative times, reduced hospital stays, lower complication rates, and less postoperative pain compared to open appendectomy. These findings support the preference for laparoscopic techniques in clinical practice due to improved surgical outcomes and enhanced patient recovery. While acknowledging study limitations, such as its retrospective nature and sample size, this research reinforces the effectiveness of laparoscopic surgery and encourages its continued adoption in treating uncomplicated appendicitis. Further prospective studies are recommended to validate these results and explore broader applications in appendectomy procedures.

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