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Comparative Outcomes of Laparoscopic and Open Surgical Approaches in Children with Complicated Appendicitis

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Abstract

Background: Children with severe appendicitis are one of the most frequent surgical emergencies. Laparoscopic appendectomy has proven effective in uncomplicated appendicitis, but it is more challenging in complicated cases where the appendix becomes inflamed. Our current study aimed to compare the basic approach between laparoscopic and open surgical appendectomy in children.

Methods: Fifty cases of previously complicated appendicitis were controlled and monitored. The LA group consisted of 36 children, and the OA group consisted of 14.

The duration of symptoms of complicated appendicitis, the time required for surgery, the possibility of eating, the occurrence of complications, whether early or late, as well as the length of the patient's hospital stay and the use of certain antibiotics.

Results: There were no significant differences between the two age groups, including in the duration of symptoms or the total white blood cell count.

The surgery took 58 minutes and 5 minutes for LA and 65 minutes and 5 minutes for OA.

Patients in the LA group were more likely to return to oral feeding earlier (3 ± 1 days) compared to those in the control group (4 ± 1 days) for each osteoporosis patient. Still, they remained in the hospital for a

shorter period (3 ± 1 days) compared to the osteoporosis patients (5 ± 1 days).

Only 6% of people in group LA got a wound infection, but 20% of people in group OA did.

Conclusions: The laparoscopic method can be used to treat severe appendicitis in kids, and it is safe. Most of the time, laparoscopic appendectomy is the best way to treat children with severe appendicitis.

Introduction.

Acute appendicitis is known as the most common surgical emergency in pediatric patients, with incidence peaking between the ages of 10 and 14 years. Children are at a fourfold greater risk compared to other demographics. Despite the remarkable progress made by science and technology in the assessment and accurate diagnosis of children with appendicitis during the past period, the

incidence of complicated appendicitis has remained unchanged (1). When appendicitis is early, swollen, and simple, it is called uncomplicated appendicitis. When it is gangrenous, perforated, and has an abscess or phlegm, it is called complex appendicitis. Many studies didn't show that LA was better than OA, but this could be because those studies were done during the learning phase (2). When compared to kids with uncomplicated appendicitis, those with complex disease have more extended hospital stays and cost more. Since 1983, when it was first used to treat appendicitis, laparoscopic surgery has been the best way to treat uncomplicated appendicitis.

The advantages of the laparoscopic method in complicated appendicitis are that it makes it easier to look at the whole abdomen, reduces the trauma of surgery, and allows for careful peritoneal lavage (3). When compared to open appendectomy (OA), laparoscopic appendectomy (LA) requires more professional skill, takes longer, and is linked to a higher risk of intra-abdominal collections. Newer studies show that this treatment is safe and can be done for people with complicated appendicitis. There is a low risk of infectious complications (4).

Recent studies have shown that this treatment is safe for people with complicated appendicitis, with only a small risk of complications.

The study aimed to compare the outstanding outcomes of closed and open appendectomy in children with acute appendicitis.

Methods.

- The study was conducted in the Department of Pediatric Surgery at the teaching hospital for six years, starting from January 2018 to January 2024.
- The study encompassed all paediatric cases of complex appendicitis, including perforated, gangrenous, and mass forms. Children diagnosed with uncomplicated appendicitis were excluded.
- The children's data were documented, including sex, age, symptoms, and duration.
- All clinical and radiological assessments, blood counts, and kidney function tests were recorded.
- After completing the required testing, children with acute appendicitis had surgery within 24 hours after being admitted to the hospital.
- A laparoscopic (group A) and an open (group B) appendectomy were the categorizations of the children.
- Before surgery, each child was given suitable antibiotics consisting of a combination of first-generation cephalosporins, metronidazole, and amikacin.
- The open appendectomy was performed via the right lateral incision.
- After the appendix was located, it was moved, its base was ligated, and then removed.
- The abscess was drained from the perforation, followed by appendectomy and peritoneal lavage.
- The appendectomy was performed laparoscopically using a three-port approach.
- The ports are located just above the navel (the left and right iliac fossa).
- The expert draining the pus was done right away, and then the appendix was removed and lavaged.
- A drainage tube was placed in the children, which was then removed postoperatively.
- The results of complicated appendicitis surgery were documented, as were the location of the appendix and the presence of stones.
- The length of time an antibiotic is administered intravenously, period of stay, and subsequent consumption were recorded for every group.
- The period required to follow up the patients' medical conditions ranged between 6 months and 2 years.

All pending and immediate group problems have been evaluated.

Results.

Fifty kids had surgery for complicated appendicitis during the study time. It is stated how many boys and girls are in each group, along with their respective ages.

There was no statistically significant difference between the groups in terms of age. An open appendectomy was done on more women than a laparoscopic appendectomy.

Table no.1: Distribution of case numbers as age and gender:

Group LA Ages, and Group OA Ages (10 -14 years)			
Group LA Ages		Group OA Ages	
Male	20	Male	4
Female	16	Female	10
Total number	36	Total number	14

Table No. 2: Average length of discomfort upon presentation:

group LA	Group OA
3 days	4 days

Table No.3: The mean total leucocyte count:

group A	Group B
14,000	15,000

The operative time for LA (58 ± 5 minutes for LA versus 65 ± 5 minutes for OA) was significant. Three cases out of every hundred switched from the laparoscopic method to the open approach. There were two cases of conversion because of thick adhesions of small bowel loops that formed a mass.

One time, the appendix was stuck to the side wall of the abdomen and the caecum behind the ileum. The decision to switch from closed to open was made due to the risk of damaging the caecum.

Duration of intravenous antibiotics, oral feeding, and hospital stay.

The length of time injectable antibiotics were administered was 4 ± 1 days in group LA and 5 ± 1 days in group OA, which was a significant difference.

In group LA, it took 2 ± 1 days to start mouth feeding, whereas in group OA, it took 3 ± 1 days, which is a significant difference.

The hospital stay was 3 ± 1 days (range: 3–6 days) for group LA and 5 ± 1 days (range: 8–8 days) for group OA, representing a significant difference.

Early and Late Issues Frequency:

Two patients in the LA group had wound infections as early complications after surgery.

Both of these cases were treated with simple measures, such as regular dressing.

Patients in group OA had early complications after surgery in the form of wound infections, and three people had late problems with adhesive obstruction shapes.

Two of the three cases with "adhesive obstruction" did not require surgery to be fixed. They were given antibiotics and water through an IV. The remaining one had to have a second laparotomy to break up the adhesions.

During the study, no deaths occurred. In total, after surgery, two people in group LA and six people in group OA had problems.

Discussion

The clinical presentation of pediatric appendicitis is characteristically marked by persistent pain, initially centered in the periumbilical region and subsequently migrating to the right iliac fossa. In

most cases, this pain is accompanied by vomiting and anorexia, along with fever, which is a prevalent symptom.

The assessment of the abdomen may reveal indications of localized or diffuse discomfort, guarding, rebound tenderness, and masses, although these indicators are more readily discernible in older children.

A misdiagnosis can occur frequently, with gastroenteritis being the most prevalent. Occasionally, the diagnosis is postponed, resulting in an exacerbation of the illness and culminating in severe appendicitis.

Laparoscopy is currently the preferred method for managing severe appendicitis; nevertheless, it is not always easily executed in extremely young infants.

The laboratory assessment of white blood cell counts and C-reactive protein (CRP), combined with radiographic methods such as ultrasonography or computed tomography, may facilitate an accurate and early diagnosis (5).

Pneumoperitoneum in babies should be maintained at low pressure to mitigate potential hemodynamic consequences, resulting in restricted working space.

In cases of complicated appendicitis, especially in overweight children, laparoscopic appendectomy (LA) may be better than open appendectomy (OA) because it reduces tissue damage, improves visualisation of abdominal cavities, allows for more precise peritoneal irrigation, avoids cutting and stretching the wound, and limits the amount of time the wound surface is exposed to contaminated fluids. The pain after surgery is lessened, normal activities can be resumed quickly, and most importantly, the results look better. Distribution of case numbers by age and gender is illustrated in Figure 1, as shown below:

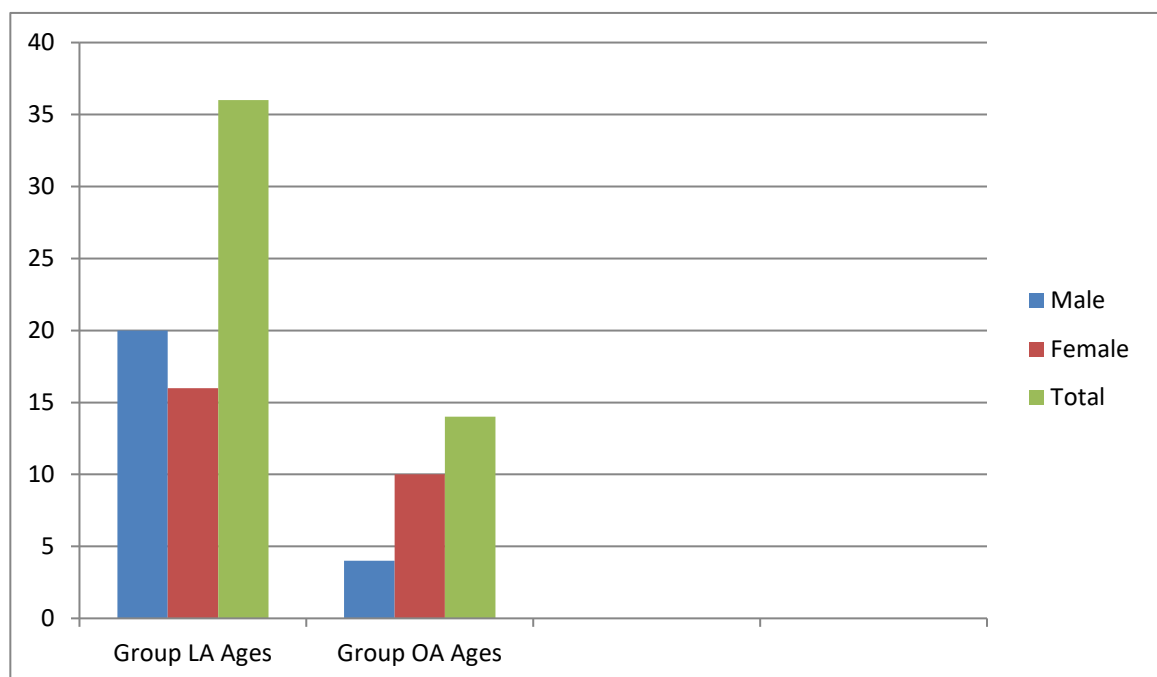


Figure No. 1: Group LA Ages, and Group OA Ages (10 -14 years).

Based on all of the above, the primary objective of the research was to assess the effectiveness of our facility's laser treatment for youngsters with acute appendicitis. Age, gender, length of discomfort, and white blood cell count did not differ significantly between the two groups according to statistics.

The operating duration for LA is 58 ± 5 minutes, compared to 65 ± 5 minutes for OA. This closely resembled the work of Khirallah et al.

The average operating duration for the LA in complex patients is 56.41 minutes; on the other hand, OA is 63.42 minutes.

This closely aligns with Khirallah et al., who recorded an average operating duration of 55.8 minutes for the LA and 57.94 minutes for the OA (6).

Other investigations have indicated a prolonged or abbreviated operational duration. This disparity may be ascribed to the variation in the proficiency of the laparoscopist (7).

In our study, the length of intravenous antibiotic administration was considerably shorter in LA group (four days) compared to the OA group (6 days).

Oral antibiotics were initiated in children undergoing laparoscopic surgery as soon as they commenced oral intake. This significantly reduced the need for intravenous antibiotics.

Patients with LA could start eating in two to three days, but people with OA had to wait four to six days. That is also according to Padankatti et al (8) found; feeds are set up in two and a half days for LA group and in 3.7 days for OA group (9). This study found that OA group had a much more extended hospital stay (5 ± 1) than the LA group (3 ± 1). It was shown by Aziz et al. (10) that people who had LA had significantly shorter hospital stays, even if the surgery was complex. He believed that these results might be connected to the benefits of laparoscopic treatments, such as reduced pain after surgery and the ability to move around more quickly, which allow patients to leave the hospital earlier.

Many studies have found that the risk of wound infections after surgery is significantly lower with LA than with OA (1.3% versus 12.5%).

During our study, two people in group LA and six people in group OA had problems after surgery (11). Some studies have found insufficient evidence to support the laparoscopic approach for treating complicated appendicitis (12).

However, some people concluded that LA is better than open OA for complicated appendicitis (13). When trying to determine what's wrong with a child, laparoscopy is helpful because it allows doctors to see all the organs.

Conclusion:

The laparoscopic method is deemed adequate for managing complicated appendicitis in pediatric patients. Laparoscopic appendectomy for severe appendicitis in pediatric patients is both safe and practical. It is associated with reduced average surgical duration, prompt initiation of oral intake, a decreased incidence of infection complications, and a shorter hospital stay. Consequently, in cases of complicated appendicitis in children, it may be the best choice.

References.

1. Serres SK, Cameron DB, Glass CC, Graham DA, Zurakowski D, Karki M, et al. Time to Appendectomy and Risk of Complicated Appendicitis and Adverse Outcomes in Children. *JAMA Pediatr.* 2017;171(8):740-6.
2. Moberg AC, Montgomery A. Introducing diagnostic laparoscopy for patients with suspected acute appendicitis. *Surg Endosc* 2000; 14:942–947.
3. Horwitz JR, Custer MD, May BH, Mehall JR, Lally KP. Should laparoscopic appendectomy be avoided for complicated appendicitis in children? *J Pediatr Surg.* 1997;32(11):1601-3.
4. Kassem R, Shreef K, Khalifa M. Effects and clinical outcomes of laparoscopic appendectomy in young children with complicated appendicitis: a case series. *Egyptian J Surg.* 2017; 36:152-5.
5. Tsai C.-C., Lee S.-Y., Huang F.-C. Laparoscopic versus open appendectomy in the management of all stages of acute appendicitis in children: a retrospective study. *Pediatrics and Neonatology.* 2012;53(5):289–294. doi: 10.1016/j.pedneo.2012.07.002.

6. Khirallah MG, Eldesouki NI, Elzanaty AA, Ismail KA, Arafa MA. Laparoscopic versus open appendectomy in children with complicated appendicitis. *Ann Pediatr Surg.* 2017;13(1):17-20.
7. Mohajerzadeh LL, Rouzrokh M, Tabari AK. Laparoscopic appendectomy in complicated appendicitis of children. *Ann Colorectal Res.* 2014;2: e16599.
8. Padankatti LR, Pramod RK, Gupta A, Ramachandran P. Laparoscopic versus open appendectomy for complicated appendicitis: A prospective study. *J Indian Assoc Pediatr Surg.* 2008;13(3):104-6.
9. Aziz O, Athanasiou T, Tekkis PP, Purkayastha S, Haddow J, Malinovski V, et al. Laparoscopic versus open appendectomy in children: a meta-analysis. *Ann Surg.* 2006; 243:17-27.
10. Marzouk M, Khater M, Elsadek M, Abdelmoghny A. Laparoscopic versus open appendectomy: a prospective comparative study of 227 patients. *Surg Endosc.* 2003; 17:721-4.
11. Vahdad MR, Troebs R, Nissen M, Burkhardt LB, Hardwig S, Cernaianu G. Laparoscopic appendectomy for perforated appendicitis in children has complication rates comparable with those of open appendectomy. *J Pediatr Surg.* 2013; 48:555-61.
12. Krisher SL, Browne A, Dibbins A, Tkacz N, Curci M. Intra-abdominal abscess after laparoscopic appendectomy for perforated appendicitis. *Arch Surg.* 2001; 136:438-41.
13. Wang X, Zhang W, Yang X, Shao J, Zhou X, Yuan J. Complicated appendicitis in children: is laparoscopic appendectomy appropriate? A comparative study with the open appendectomy- our experience. *J Pediatr Surg.* 2009; 44:1924-7.