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# Understanding pediatric appendicitis: A-mini review

Mustafa Atan<sup>1</sup>, Serkan Arslan<sup>1</sup>

1. Dicle University Medical School, Department of Pediatric Surgery, Diyarbakir, Turkey.

## Abstract

Appendicitis, an inflammation of the appendix, is a common surgical emergency in children, with symptoms ranging from abdominal pain and fever to changes in bowel movements and appetite. Diagnosing pediatric appendicitis can be challenging due to symptom variability and the difficulty children may have in articulating pain. However, prompt diagnosis and treatment are essential to avoid severe complications like gangrene or perforation. The condition is usually caused by blockage in the appendix due to hardened stool, swollen lymphoid tissues from infections, or, rarely, foreign bodies. Diagnosis typically involves a combination of medical history, physical examination, and diagnostic tests including blood counts, urinalysis, and imaging studies such as ultrasound, CT scans, or MRI.

Treatment primarily involves an appendectomy, either through open surgery or a laparoscopic approach, with the latter now considered the gold standard due to benefits like less post-operative pain and shorter recovery time. In some cases of uncomplicated appendicitis, non-operative management with antibiotics and close monitoring may be pursued, although there's a risk of recurrence.

Postoperative care is vital and includes pain management, wound care, a gradual return to a normal diet, and a cautious return to physical activities. Despite the commonality of pediatric appendicitis, swift action in diagnosis and intervention, coupled with proper post-operative care, ensures a complete recovery and normal continuation of growth and development.

### Correspondence

Serkan arslan, Dicle University  
Medical School, Department  
of Pediatric Surgery, Diyarbakir,  
Turkey

### e-mail

[drserkanarslan@hotmail.com](mailto:drserkanarslan@hotmail.com)

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### ORCID ID of the author(s):

MA: 0009-0007-6152-0201

SA: 0000-0002-5879-4478

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## Introduction

Appendicitis is the most common surgical emergency in children, and timely diagnosis and intervention are crucial to prevent severe complications. Despite being a common condition, diagnosing appendicitis in children can be challenging due to the variability in symptoms, their ability to articulate pain, and a higher likelihood of developing complications such as perforation and abscess. This comprehensive guide discusses pediatric appendicitis, including its symptoms, causes, diagnostic procedures, and treatment options (1,2).

## Understanding pediatric appendicitis

The appendix is a small, tube-shaped organ attached to the first part of the large intestine, known as the cecum. Appendicitis refers to the inflammation of the appendix, usually caused by a blockage in the appendix lumen, which leads to infection and inflammation (3).

In pediatric patients, the spectrum of appendicitis ranges from early, uncomplicated inflammation to gangrene and perforation. The perforation rate is particularly high in children under five, making early diagnosis and treatment of paramount importance (4).

## Symptoms

The presentation of appendicitis in children may vary with age and the stage of the disease. Some of the commonly reported symptoms include (5):

- » *Abdominal pain:* This is the most common symptom of appendicitis. In children, the pain often starts around the navel and migrates to the lower right side of the abdomen, the location of the appendix.
- » *Fever:* A low-grade fever may accompany appendicitis and can be a systemic response to infection.
- » *Vomiting:* Nausea and vomiting may occur, usually after the onset of pain. These symptoms result from the inflammation and irritation of the nearby organs by the inflamed appendix.
- » *Loss of appetite:* Children with appendicitis might experience anorexia or a significant loss of appetite. In some cases, this might be the first noticeable symptom.
- » *Change in bowel movements:* Some children may experience constipation, diarrhea, or difficulty passing gas.

While these symptoms are common, they are not exclusive to appendicitis and could be indicative of other gastrointestinal or urinary tract issues. However, if these symptoms persist or worsen, seeking immediate medical attention is crucial (6,7).

## Etiology

Pediatric appendicitis, like its adult counterpart, is primarily caused by the obstruction of the appendix. The obstruction could be due to multiple reasons (8,9):

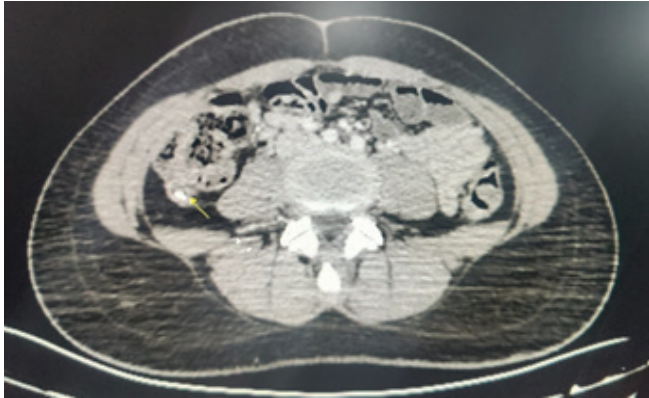
- » *Fecaliths:* Fecaliths, or hardened stool, are the most common cause of obstruction leading to appendicitis. The blockage causes an increase in pressure, impaired blood flow, bacterial multiplication, inflammation, and ultimately infection of the appendix.
- » *Lymphoid hyperplasia:* Viral or bacterial infections can cause the lymphoid tissues in the appendix to swell, leading to obstruction. This condition is commonly seen during upper respiratory tract infections or gastroenteritis.
- » *Foreign Bodies:* On rare occasions, ingestion of foreign bodies that enter the appendix can cause obstruction.

## Diagnosis

A combination of medical history, physical examination, and diagnostic tests helps in diagnosing pediatric appendicitis (10).

- » *Medical history and physical examination:* The child's symptoms, the progression of the pain, and any changes in bowel movements or eating habits form a crucial part of the medical history. The physical examination will likely involve palpating the abdomen to check for tenderness, especially in the right lower quadrant.
- » *Laboratory tests:* A complete blood count (CBC) might show leukocytosis, an increase in white blood cells, a common reaction to infection or inflammation. Urinalysis may be used to rule out a urinary tract infection, and a pregnancy test might be conducted in adolescent girls to rule out ectopic pregnancy, which can have similar symptoms.
- » *Imaging Studies:* Ultrasound is often the first imaging study used in children due to its non-invasive nature and lack of radiation. It can detect an enlarged or inflamed appendix and other signs such as free fluid or abscess formation. If the ultrasound is inconclusive, a CT (**Figure 1**) scan or

an MRI can be utilized. CT scans provide a more detailed view, but they involve radiation exposure, while MRI provides comparable sensitivity and specificity without radiation but may require sedation in younger children due to the need for the child to remain still (11,12).



**Figure 1:** A view of appendix (CT)

### Treatment

The mainstay of treatment for pediatric appendicitis is the surgical removal of the appendix, known as an appendectomy (**Figure 2**). However, recent advances have led to the exploration of non-operative management in certain cases (13).

- » *Surgical:* Traditionally, an open appendectomy was performed, but with advancements in medical technology, the laparoscopic appendectomy has become the gold standard. Laparoscopic surgery involves making small incisions through which a camera and surgical instruments are inserted, providing a magnified view of the surgical area. The benefits of laparoscopic surgery include less post-operative pain, shorter hospital stay, faster recovery, and reduced risk of wound infection.
  - » *Open appendectomy:* This procedure involves making a single larger incision in the lower right area of the abdomen to remove the appendix. It might be chosen in cases of complicated appendicitis where an abscess or mass is present.
  - » *Laparoscopic appendectomy:* In this procedure, several small incisions are made, and the surgeon uses special surgical tools fed through the incisions to remove the appendix. This procedure leads to shorter recovery times and less scarring compared to open surgery.
- » *Non-operative management:* This includes the administration of antibiotics and close monitoring of the child. While it may prevent the need for surgery in some cases of uncomplicated

appendicitis, there's a risk of recurrence. The decision to opt for non-operative management should be based on careful consideration of the child's condition, parent's comfort, and availability for close follow-up (14).



**Figure 2:** Intraoperative view of inflamed appendix

### Postoperative care and recovery

After an appendectomy, the child is usually able to go home after a few days, depending on the severity of the appendicitis and the presence of complications. Pain management, wound care, and a gradual return to normal activities form a crucial part of the recovery process (15,16).

- *Pain management:* Over-the-counter pain medication, or in some cases, prescription medication, may be required for a few days after surgery. It's important to follow the doctor's instructions regarding dosage and timing to effectively manage the pain and discomfort.
- *Wound care:* Keeping the incision area clean and dry is essential. The doctor will provide instructions about when the child can bathe or shower and how to care for the incision site.
- *Diet:* A light diet is typically recommended immediately after surgery. Gradually, as the child's bowel function returns to normal, they can return to their regular diet.
- *Activity:* While rest is essential, gentle movement is encouraged to promote healing and prevent complications. The doctor will provide guidelines about when the child can return to school and resume physical activities.

**Conclusions**

Pediatric appendicitis, while common, demands swift action. Early diagnosis, appropriate intervention, and proper post-operative care can ensure a complete recovery and continuation of normal growth and development.

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**References**

1. Basuguy E, Okur MH, Arslan S, Aydoğdu B, Akdeniz S, Azizoğlu M. Çocuklarda torakoport yardımlı laparoskopik apendektomi sonuçlarımız. *Dicle Med J*. 2020;47(3):727-34.
2. Aydoğdu B, Azizoğlu M, Arslan S, Aydoğdu G, Basuguy E, Salık F, et al. A novel diagnostic scoring system for pediatric appendicitis based on age and sex-adjusted hematological parameters. *Gac Med Mex*. 2023;159(2):103-9.
3. Arslan S, Aydogdu B, Arslan MS, Zeytun H, Okur MH, Basuguy E, et al. Analysis of Risk Factors for Appendicitis in Children: A Multicenter Epidemiological Study. *Dicle Med J*. 2016;43(4):556-60.
4. Bhangu A, Søreide K, Di Saverio S, Assarsson JH, Drake FT. Acute appendicitis: modern understanding of pathogenesis, diagnosis, and management. *Lancet*. 2015;386(10000):1278-87.
5. D'Souza N, Nugent K. Appendicitis. *Am Fam Physician*.

2016;93(2):142-3.

6. Walter K. Acute Appendicitis. *JAMA*. 2021;326(22):2339.
7. Rassi R, Muse F, Cuestas E. Apendicitis aguda en niños menores de 4 años:Un dilema diagnóstico. [Acute appendicitis in children under 4 years:a diagnostic dilemma]. *Rev Fac Cien Med Univ Nac Cordoba*. 2019;76(3):180-4.
8. Glass CC, Rangel SJ. Overview and diagnosis of acute appendicitis in children. *Semin Pediatr Surg*. 2016;25(4):198-203.
9. López JJ, Deans KJ, Minneci PC. Nonoperative management of appendicitis in children. *Curr Opin Pediatr*. 2017 Jun;29(3):358-62.
10. He K, Rangel SJ. Advances in the Diagnosis and Management of Appendicitis in Children. *Adv Surg*. 2021;55:9-33.
11. Becker C, Kharbanda A. Acute appendicitis in pediatric patients: an evidence-based review. *Pediatr Emerg Med Pract*. 2019;16(9):1-20.
12. Almaramhy HH. Acute appendicitis in young children less than 5 years: review article. *Ital J Pediatr*. 2017;43(1):15.
13. Rentea RM, St Peter SD. Contemporary Management of Appendicitis in Children. *Adv Pediatr*. 2017;64(1):225-51.
14. Aydoğdu H. Appendicitis: At a glance. *Ulus Med J*. 2023;1(2):22-5.
15. Caruso AM, Pane A, Garau R, Atzori P, Podda M, Casuccio A, et al. Acute appendicitis in children: not only surgical treatment. *J Pediatr Surg*. 2017;52(3):444-8.
16. Rentea RM, Peter SDS, Snyder CL. Pediatric appendicitis: state of the art review. *Pediatr Surg Int*. 2017;33(3):269-83.

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