Case Report

Journal Homepage: http://crcp.tums.ac.ir

The Association between Varicella and Acute Appendicitis: A Rare Case Report and Literature Review

Mahya Sadat Mohammadi[1], Golnaz Ghazizadeh Esslami[1], Amir Hossein Dehghan[2], Matineh Sadat Tabatabaei[2*]

1. Department of Emergency, Pediatrics Center of Excellence, Children's Medical Center Hospital, Tehran University of Medical Sciences, Tehran, Iran.

2. Student Scientific Research Center (SSRC), Nursing and Midwifery School, Tehran University of Medical Sciences, Tehran, Iran.

Use your device to scan and read the article online

Citation Mohammadi MS, Ghazizadeh Esslami G, Dehghan AH, Tabatabaei MS. The Association between Varicella and Acute Appendicitis: A Rare Case Report and Literature Review. Case Reports in Clinical Practice. 2025; 10(3): 98-102. DOI:10.18502/crcp.v10i3.20308

Running Title Varicella and Acute Appendicitis Association

Article info:
Received: April 24, 2025
Revised: May 15, 2025
Accepted: June 27, 2025

Keywords:
Varicella; Acute appendicitis; Pediatrics

ABSTRACT

Varicella-zoster virus, the causative agent of chickenpox, is typically a self-limiting disease. However, in rare cases, it has been associated with atypical complications. Here, we report a unique case of acute appendicitis following varicella infection in an otherwise healthy individual. The possible mechanisms linking varicella to appendiceal inflammation remain unclear, but viral-induced immune dysregulation and secondary bacterial infection have been suggested. In our study, we aim to highlight this rare association, discuss potential pathophysiological mechanisms, and review the existing literature on similar cases.

Introduction

Herpes viruses represent a variety of DNA viruses that can remain dormant in the body permanently [1]. Varicella-zoster virus (VZV), part of this family group, causes chickenpox [2]. VZV primarily affects children, with infections commonly occurring between the ages of 3 and 6. The virus spreads through inhalation of secretions containing the virus or through contact with skin sores [3,4].

One of the common reasons for abdominal surgery in children is acute appendicitis, which has multiple causes despite its uncertain origin—particularly when luminal obstruction is considered the primary factor, involving fecaliths and lymphoid follicle hyperplasia [5,6]. Moreover, bacterial infections such as *E. coli*, *Bacteroides fragilis*, *Yersinia*, *Salmonella*, and *Shigella*, as well as parasitic infections like *Entamoeba histolytica*, and both localized and systemic viral infections—including Epstein-Barr virus, measles virus, adenovirus, and cytomegalovirus—can trigger immune responses in the lymphoid follicles of the appendix [7,8].

In this article, we present a patient in whom acute

*** Corresponding Author:**
Matineh Sadat Tabatabaei
Address: *Student Scientific Research Center (SSRC), Nursing and Midwifery School, Tehran University of Medical Sciences, Tehran, Iran.*
E-mail: *Matinehtabatabaei00@gmail.com*

appendicitis is associated with VZV infection. Given the diagnostic challenges presented by this case and the unique histopathological findings in the appendix, we have also reviewed other reported cases in the scientific literature.

Case Presentation

A 12-year-old boy was admitted to the emergency department of Children's Medical Center in Tehran, Iran, with a recent history of VZV infection from 10 days prior (Figure 1), presenting with complaints of profuse diarrhea, anorexia, and abdominal pain. He also reported decreased urine output and fever. On physical examination, the patient exhibited abdominal guarding and tenderness in the hypogastric region. Given the presence of acute abdominal signs in the context of a recent varicella infection, extensive laboratory testing and imaging studies were initiated.

Laboratory findings indicated:

- Elevated C-reactive protein (CRP) >200 mg/L, suggesting a systemic inflammation.
- Proteinuria and ketonuria on urinalysis.
- Elevated international normalized ratio (INR), indicating possible coagulopathy.

Abdominal ultrasonography revealed a dilated appendix measuring 10 mm in diameter (Figure 2), accompanied by periappendiceal phlegmon, mural thickening of the terminal ileum and cecum, and mild free fluid in both the abdominal and pelvic cavities—findings indicative of complicated appendicitis.

Fig. 1. VZV Infection Vesicle

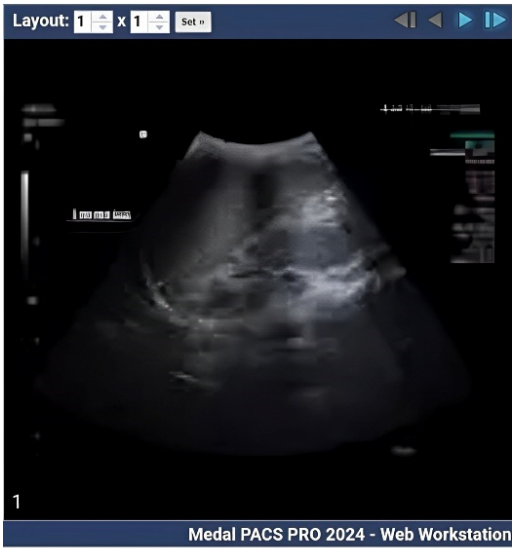

Fig. 2. Abdominal Ultrasound- showing perforated appendix with 10 mm in diameter

Fig. 3. Abdominal X-ray Result- Normal

Abdominal X-ray results were normal, with no calcifications observed (Figure 3). Given the clinical and radiological suspicion of complicated appendicitis, the patient was promptly started on intravenous broad-spectrum antibiotics, including cefotaxime and metronidazole, for comprehensive coverage.

The patient was then taken to the operating room and placed in the supine position under general anesthesia. During exploration, the appendix was observed to be in a ventral position, significantly inflamed, and perforated, confirming the diagnosis of perforated appendicitis. The mesoappendix was meticulously ligated with three interrupted sutures before being transected, and an appendectomy was performed.

The patient was subsequently transferred to the postoperative care unit in stable condition, where he continued to receive intravenous antibiotics and was closely monitored for any potential complications. Over the next few days, his diarrhea subsided, inflammatory markers decreased, and he exhibited notable clinical improvement. Ultimately, the patient was discharged on oral antibiotics with a plan for close outpatient follow-up to ensure complete recovery and prevent postoperative complications.

Discussion

Severe complications from varicella are rare in immunocompetent children, with scarring from secondary bacterial infections (e.g., staphylococcal or streptococcal) due to pruritus being the most common [9]. T cells in the appendix play a crucial role in the immune response by facilitating lymphoid hyperplasia and contributing to the body's defense mechanisms against infections such as VZV [10]. The patient presented in this paper highlights several notable aspects of varicella and appendicitis, including their simultaneous occurrence, which will be discussed below.

Although VZV is primarily a cutaneous and mucosal disease, viremia can lead to systemic involvement. Studies have suggested that viral infections, including VZV, may trigger an exaggerated immune response in the gastrointestinal tract. One possible mechanism is lymphoid hyperplasia, which can cause luminal obstruction and appendiceal inflammation [11]. Another potential factor is altered gut microbiota, as systemic viral infections have been reported to disrupt gut microbial balance, increasing susceptibility to bacterial superinfections and inflammatory responses [12,13].

There are few reported cases of appendicitis as a complication of VZV in the literature. One such case involved an 11-year-old boy reported by Zenon Pogorelić, in whom PCR analysis confirmed the diagnosis [14]. Another manuscript described a 5-year-old girl with DiGeorge syndrome and a recent varicella infection who developed perforated appendicitis, confirmed by CT and laparotomy, with histopathological evidence of necrotizing inflammation and VZV DNA detected in appendiceal tissue [15]. Additionally, there is a report of an 11-year-old girl who experienced varicella after undergoing an appendectomy [16], suggesting a possible two-way connection between appendicitis and varicella. A comparison of these reported cases with our patient is presented in Table 1.

Table 1. Comparison of reported cases with our patient

Author	Patient Age and Gender	Presentation	Diagnostic Methods	Complications	Treatment	Key Findings
Our Patient	12 years, boy	Recent varicella (10 days prior) followed by appendicitis	Abdominal ultrasound, clinical exam, lab tests (CRP, urinalysis), intraoperative findings	Perforated appendicitis, periappendiceal phlegmon, mural thickening, free fluid	IV antibiotics (cefotaxime, metronidazole), appendectomy	High CRP (200 mg/L), suggesting severe inflammation; lymphoid hyperplasia possible mechanism
Pogorelić[14]	11 years, boy	Simultaneous varicella and appendicitis	PCR analysis	Not reported	Not reported	PCR-confirmed VZV in appendix
Smedegaard[15]	5 years, girl	Recent varicella followed by perforated appendicitis	CT, laparotomy, histopathology, PCR	Perforated appendicitis, necrotizing inflammation	Laparotomy, appendectomy	VZV DNA in appendiceal tissue
Kilic[16]	11 years, girl	Appendectomy followed by varicella	Appendectomy	Not Reported	Appendectomy	Two-way connection between appendicitis and varicella

According to studies, C-reactive protein (CRP) levels in appendicitis are most commonly reported to range between 10–50 mg/L, and between 3–20 mg/L in varicella [17,18]. A CRP level of 200 mg/L is significantly elevated for typical appendicitis or varicella alone. This strongly suggests severe inflammation or secondary bacterial complications, likely due to appendiceal perforation.

The overlapping symptoms of varicella and appendicitis could lead to a delayed diagnosis. Abdominal pain might initially be attributed to visceral hyperesthesia from varicella rather than an acute surgical abdomen. Persistent fever and gastrointestinal symptoms in a VZV patient should prompt early investigation for possible bacterial complications, such as intra-abdominal infections [19,20].

Conclusion

This case underscores the need for vigilance in pediatric patients with viral infections like VZV, which—though typically mild—can rarely cause serious complications such as appendicitis. Early detection and tailored management are critical. Clinicians should consider atypical symptoms and broaden their differential diagnosis to prevent diagnostic delays. Further research into the interaction between viral infections and the gastrointestinal system is warranted to elucidate these associations. A meticulous, individualized approach to diagnosis and treatment is essential to optimize outcomes and prevent complications.

Ethical Considerations

Ethics Statement

Ethical approval was not required for this study, as our institution does not mandate review for individual case reports or case series.

Consent

Verbal informed consent was obtained from the patient's legally authorized representative(s) for the publication of anonymized clinical information in this article.

Funding

The authors received no specific funding for this work.

Conflict of Interests

The authors declare no conflicts of interest related to this publication.

References

[1] Efstathiou S, Minson AC. Herpes virus-based vectors. Br Med Bull. 1995 Jan;51(1):45-55. https://doi.org/10.1093/oxfordjournals.bmb.a072952

[2] Gershon AA, Breuer J, Cohen JI, Cohrs RJ, Gershon MD, Gilden D, et al. Varicella zoster virus infection. Nat Rev Dis Primers. 2015 Jul 2;1:15016. https://doi.org/10.1038/nrdp.2015.16

[3] Wutzler P, Knuf M, Liese J. Varicella: efficacy of two-dose vaccination in childhood. Dtsch Arztebl Int. 2008 Aug;105(33):567-72. https://doi.org/10.3238/arztebl.2008.0567

[4] Kliegman RM, Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM, Graepel KW, Denison MR. Coronaviruses. Nelson Textbook of Pediatrics. 21st ed. Philadelphia, PA. Elsevier. 2020:1742-5.

[5] Bundy DG, Byerley JS, Liles EA, Perrin EM, Katznelson J, Rice HE. Does this child have appendicitis? JAMA. 2007 Jul 25;298(4):438-51. https://doi.org/10.1001/jama.298.4.438

[6] Rentea RM, St Peter SD. Pediatric appendicitis. Surg Clin North Am. 2017;97(1):93-112. https://doi.org/10.1016/j.suc.2016.08.009

[7] Dykes EH, Garland IW, Gray GR. Yersinia pseudotuberculosis with inflammation of the appendix: a case report. Scott Med J. 1987 Jun;32(3):82-3. https://doi.org/10.1177/003693308703200310

[8] Grynspan D, Rabah R. Adenoviral appendicitis presenting clinically as acute appendicitis. Pediatr Dev Pathol. 2008 Mar-Apr;11(2):138-41. https://doi.org/10.2350/07-06-0299.1

[9] Wutzler P, Knuf M, Liese J. Varicella: efficacy of two-dose vaccination in childhood. Dtsch Arztebl Int. 2008 Aug;105(33):567-72. https://doi.org/10.3238/arztebl.2008.0567

[10] de Costa A. The appendix-mucosal immunity and tolerance in the gut: consequences for the syndromes of appendicitis and its epidemiology. ANZ J Surg. 2022 Apr;92(4):653-60. https://doi.org/10.1111/ans.17522

[11] Soltani S, Kesheh MM, Siri G, Faramarzi S, Shahbahrami R, Didehdar M, et al. The role of viruses in human acute appendicitis: a systematic literature review. Int J Colorectal Dis. 2023 Apr 18;38(1):102. https://doi.org/10.1007/s00384-023-04391-z

[12] Ziebold C, von Kries R, Lang R, Weigl J, Schmitt HJ. Severe complications of varicella in previously healthy children in Germany: a 1-year survey. Pediatrics. 2001 Nov;108(5):E79.. https://doi.org/10.1542/peds.108.5.e79

[13] Alder AC, Fomby TB, Woodward WA, Haley RW, Sarosi G, Livingston EH. Association of viral infection and appendicitis. Arch Surg. 2010 Jan;145(1):63-71. https://doi.org/10.1001/archsurg.2009.250

[14] Pogorelić Z, Biocić M, Jurić I, Milunović KP, Mrklić I. Acute appendicitis as a complication of varicella. Acta Medica (Hradec Kralove). 2012;55(3):150-2. https://doi.org/10.14712/18059694.2015.55

[15] Smedegaard LM, Christiansen CB, Melchior LC, Poulsen A. Appendicitis Caused by Primary Varicella Zoster Virus Infection in a Child with DiGeorge Syndrome. Case Rep Pediatr. 2017;2017:6708046. https://doi.org/10.1155/2017/6708046

[16] Kilic S, Atici A, Kilincer A, Ozciftci G. A rare presentation of varicella: acute appendicitis. HK J Paediatr (New Series). 2017;22(3):179-80.

[17] Moon HM, Park BS, Moon DJ. Diagnostic Value of C-reactive Protein in Complicated Appendicitis. J Korean Soc Coloproctol. 2011 Jun;27(3):122-6. https://doi.org/10.3393/jksc.2011.27.3.122

[18] Fennell J, Territo HM, Telt N, Wrotniak BH, Kozielski R, Pape E, et al. The Association Between C-Reactive Protein Levels and Pediatric Appendicitis Score and the Severity of Appendicitis in Children. J Emerg Med. 2024 Apr;66(4):e508-e15. https://doi.org/10.1016/j.jemermed.2023.11.016

[19] Glass CC, Rangel SJ. Overview and diagnosis of acute appendicitis in children. Semin Pediatr Surg. 2016 Aug;25(4):198-203. https://doi.org/10.1053/j.sempedsurg.2016.05.001

[20] Jumah S, Wester T. Non-operative management of acute appendicitis in children. Pediatr Surg Int. 2022 Nov 28;39(1):11. https://doi.org/10.1007/s00383-022-05284-y