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Case Report

Disseminated Varicella-Zoster Virus with the Primary Manifestation of Appendicitis in an Immunocompetent 18-Year-Old Woman: A Case Report

Mahnaz Arian[1], Masoumeh Gharib[2], Saeid Amel Jamehdar[3], Hesamoddin Hosseinjani[4], Reza Pourahmadazar[5], Farshad Abedi[4]*

[1]Department of Infectious Diseases, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

[2]Department of Pathology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

[3]Antimicrobial Resistant Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.

[4]Department of Clinical Pharmacy, Faculty of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran.

[5]Department of Internal Medicine, School of Medicine, Urmia University of Medical Sciences, Urmia, Iran.

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ABSTRACT

Although varicella-zoster virus (VZV) infection is typically self-limiting in immunocompetent individuals, this case underscores its rare but fatal potential when complicated by appendicitis, hepatitis, and pneumonia. The rapid progression to septic shock in a healthy young adult makes this report novel and clinically significant. An 18-year-old previously healthy Iranian woman underwent an appendectomy, after which she developed diffuse varicella-like skin lesions. Polymerase chain reaction of peripheral blood confirmed VZV viremia. During hospitalization, she developed pneumonia, hepatitis, and septic shock requiring intensive care. Despite aggressive treatment, including intravenous acyclovir, broad-spectrum antibiotics, and hemodynamic support, she died from multiorgan failure seven days after admission. This case demonstrates that even common, typically benign infections (e.g., chickenpox) and routine surgical conditions (e.g., appendicitis) can culminate in fatal systemic complications in immunocompetent patients. Clinicians should maintain a high index of suspicion for atypical VZV presentations in adults, as early antiviral therapy may improve outcomes.

Introduction

Varicella, or chickenpox, results from the primary varicella-zoster virus (VZV), a herpesvirus, infection and manifests with a diffuse pruritic vesicular rash following a prodrome of fever, pharyngitis, malaise, or loss of appetite [1]. Herpes zoster, or shingles, also results from endogenous reactivation of latent VZV, resulting in a regional derm infection and neuropathy. Varicella is a highly contagious infection that transfers from person to person by direct contact or by air droplets from an infected person's sneezing or coughing. Most people become infected before adulthood, but 10% of young adults remain susceptible. Varicella is more severe in adults [2].

It is typically self-limited and uncomplicated, especially in children and immunocompetent subjects

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*Corresponding author.
E-mail address: Abeditf@mums.ac.ir

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after the introduction of the varicella vaccine in 1995. However, complicated varicella may sometimes develop, especially in adults. Skin and soft tissue bacterial superinfections by Staphylococcus and Streptococcus species are the most frequent complication of varicella, occurring in 42% of the complex cases. Dehydration and neurologic disorders (encephalitis and Reye syndrome) are other complications that might occur following varicella infection (incidence of 11 and 9%, respectively). Other uncommon complications of varicella included pneumonia and hepatitis. Pneumonia is the most serious complication of VZV [3]. Moreover, some previous studies reported acute appendicitis as a rare complication of VZV infection [4].

Herein, we report a case of disseminated VZV with the primary manifestation of appendicitis in an immunocompetent 18-year-old woman, who developed pneumonia, hepatitis, and septic shock following appendectomy.

Case Report

An 18-year-old Iranian woman complaining of VZV skin lesions and respiratory symptoms was transferred from a surrounding city to our department. Three days ago, she was admitted to the previous hospital with the chief complaint of abdominal pain and underwent an appendectomy with the diagnosis of appendicitis. She reported the history of VZV in her siblings about a week ago. Also, the surgeon who performed the appendectomy reported observing lesions in the abdominal cavity during the surgery, which were apparently like VZV lesions. In past medical history, she had open-heart surgery 13 years ago to repair tetralogy of Fallot and patent ductus arteriosus. She had no drug history except for prophylactic antibiotics used for the recent appendectomy surgery. In physical examination, she was ill and toxic with the VZV lesion generalized on the whole body (Figure 1). She also had slight peripheral edema and respiratory symptoms of pneumonia, including fever, productive cough, hemoptysis, tachypnea, and rales in lung auscultation.

Her vital signs were as follows: temperature of 37.6 ^{0}C, blood pressure of 107/74 mmHg, heart rate of 105 beats/minute, respiratory rate of 40/minute, and oxygen saturation of 89%. Primary laboratory investigations revealed white blood cell (WBC) 9.1×109/L (neutrophils 85.5%; lymphocytes 10.9%), hemoglobin 13.5 g/dL, platelets 65×109/L, urea 22 mg/dL, serum creatinine 0.7 mg/dL, serum sodium 135 mEq/L, serum potassium 3.6 mEq/L, normal serum electrolytes, random blood glucose 97 mg/dL, aspartate aminotransferase (AST) 892 U/L, alanine transaminase (ALT) 935 U/L, alkaline phosphatase (ALP) 539 U/L, total bilirubin 1.2 mg/dL, direct bilirubin 0.4 mg/dL, partial thromboplastin time (PTT) 44 seconds, international normalized ratio (INR) 1.42, serum albumin 3.3 g/dL, C-reactive protein (CRP) 101.9 mg/dL, and erythrocyte sedimentation rate (ESR) 2 mm/hour. Also, in venous blood gas (VBG), she had slight metabolic alkalosis (pH = 7.47, HCO_3 = 30.4, and PCO_2 = 42.1). Her lung high-resolution computed tomography (HRCT) revealed blunt costophrenic angles and diffuse involvement of both lung sides (Figure 2). In cardiologist consultation, left ventricular ejection fraction (LVEF) and heart valves were normal along with mild right ventricular enlargement, abnormal septal motion, and D shape during diastole, which was due to overload and did not require any cardiovascular intervention.

The initial diagnosis of our team was disseminated VZV accompanying appendicitis, pneumonia, and hepatitis. Polymerase chain reaction (PCR) from the peripheral blood revealed the infection of VZV. Histopathology examination of transverse and longitudinal sections of the appendix demonstrated mild chronic inflammation and congested vessels of the appendix (Figure 3 and 4).

However, the PCR of VZV DNA from the appendix was negative, which might be a false negative.

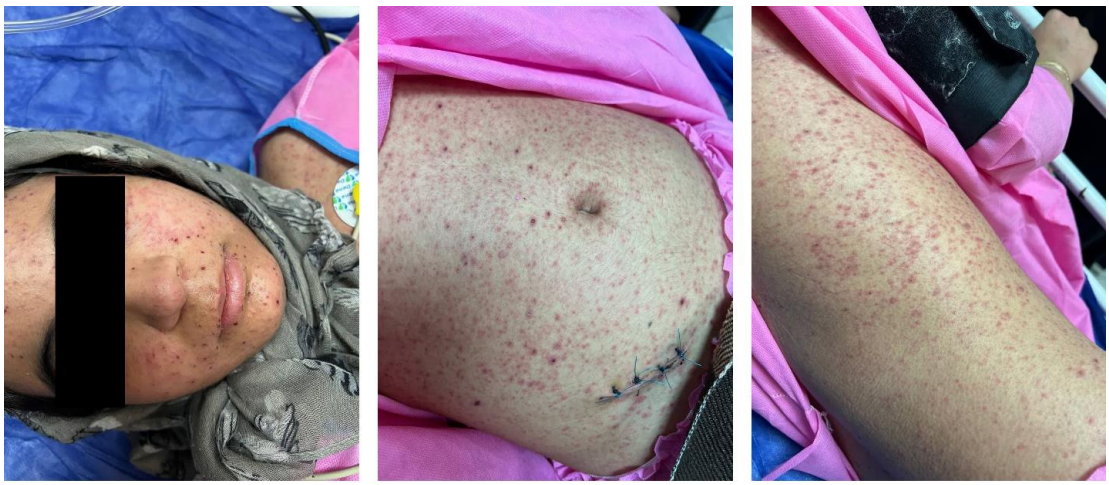

Figure 1- Varicella-zoster virus skin manifestation of the patient

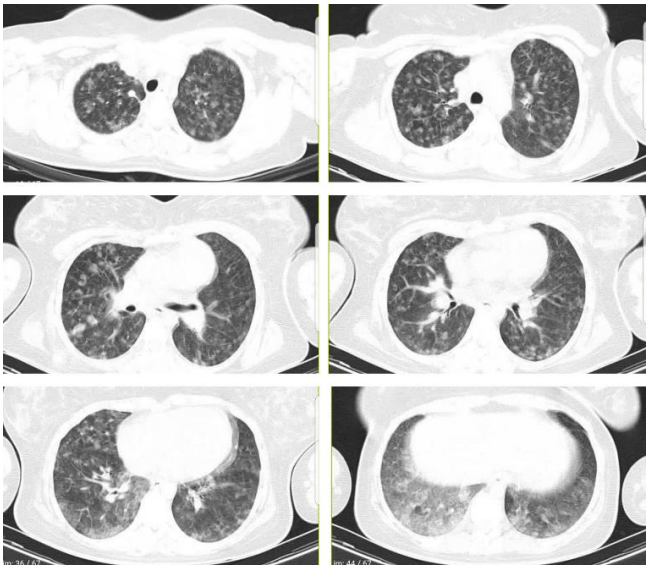

Figure 2- The patient's lung HRCT

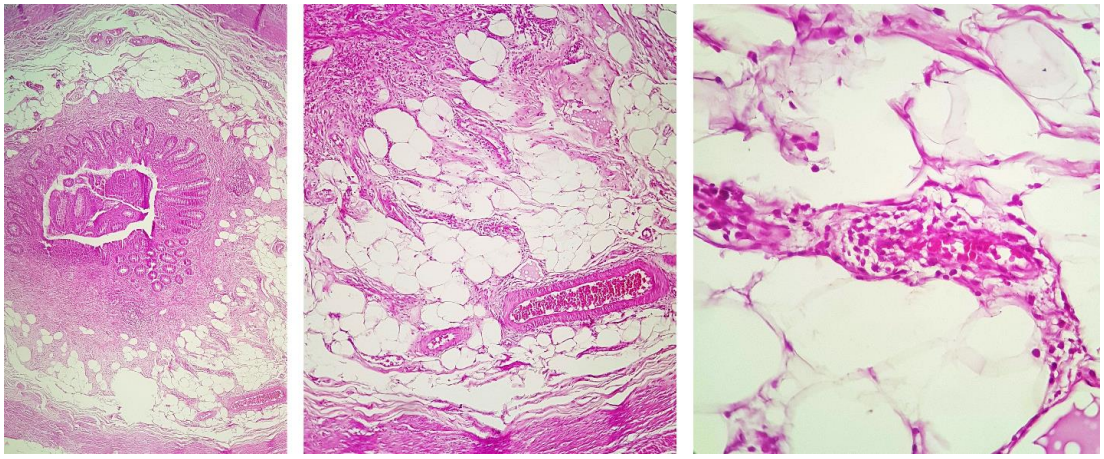

Figure 3- Transverse sections of the appendix demonstrate perivascular and interstitial mononuclear infiltration, as well as congested vessels, suggestive of mild chronic appendicitis.

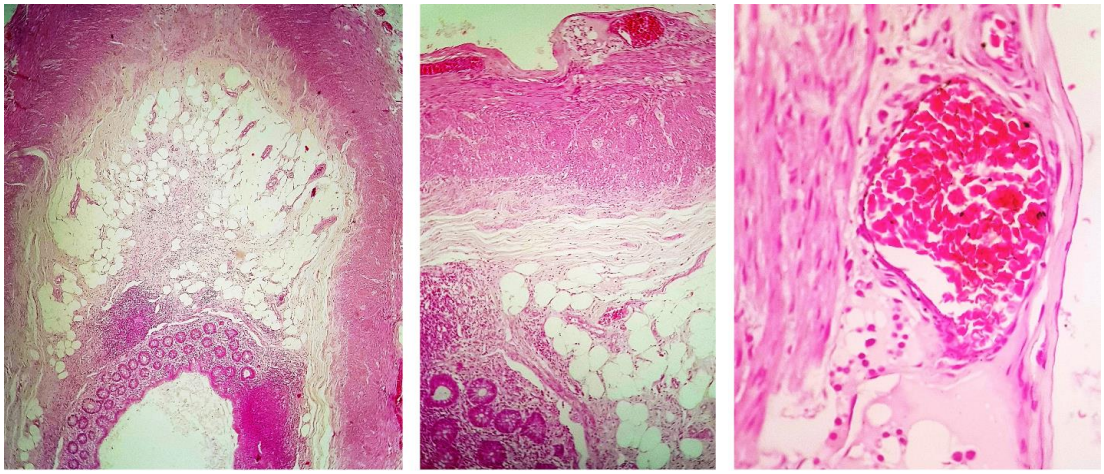

Figure 4- Longitudinal sections of the appendix. Chronic inflammation of the appendix is demonstrated by prominent vascular and interstitial lymphocytic and plasmocytic infiltration. Congested vessels are also evident. A focus on perivascular mononuclear infiltration and congestion is highlighted in the serosa.

The patient was transferred to the isolated room in the intensive care unit (ICU). From the previous hospital, she was receiving intravenous acyclovir (10 mg/kg three times a day), ceftriaxone (2 g once daily), and metronidazole (500 mg three times a day), which was continued in our department. The next day, her condition deteriorated, and she was intubated due to a decreased level of consciousness and hypotension. We performed a sepsis workup along with supportive treatment, and broad-spectrum antibiotics were started for the patient. During hospitalization, the patient's liver enzymes were reduced. However, the patient's WBC, ESR, and CRP were raised (19 ×109/L, 42 mm/hour, and 369 mg/dL, respectively). Peripheral blood culture, urine culture, and tracheal culture results excluded any source of infection other than VZV for the patient's septic shock. Unfortunately, despite supportive and antiviral treatment in the ICU, the patient passed away 7 days after admission.

Discussion

We reported a case of a young adult immunocompetent patient with the primary manifestation of inflammatory appendicitis, which developed generalized skin lesions, hepatitis, pneumonia, and septic shock thereafter.

Appendicitis, an inflammation of the appendix, is the most common reason for emergency surgery in childhood and young adulthood (ages between 6-18 years). Its etiology is not yet quite understood but seems to be multifactorial. Obstruction of the appendiceal lumen by lymphoid follicles is the primary cause of appendicitis. It is caused by fecaliths, carcinoid tumors, foreign bodies, and lymphoid hyperplasia induced by viral or bacterial infections [5].

Acute appendicitis is an infrequent and exceptional complication of chickenpox and is rarely reported. For the first time in 1950, a case of varicella encephalitis complicated with appendicitis and peritonitis was reported [6]. Another case series in 1990 reported four children with varicella, perforated appendicitis, and peritonitis [7]. In 2002, another case of a nine-year-old girl with varicella and acute perforated appendicitis was reported [8]. In 2011, a case of an 18-year-old immunocompetent man with acute VZV and accompanying inflammation of the appendix was reported. He was observed with standard antiviral therapy and ten days later relieved from appendicitis and varicella [9]. Another case report in 2012 described an 11-year-old boy with acute varicella and appendicitis. He underwent an appendectomy, and histological evaluation of the appendix revealed diffuse proliferation of inflammatory cells, transmural acute inflammation, and characteristic viral changes, including intranuclear inclusion surrounded by a clear halo. Moreover, the PCR analysis of the appendix tissue specimen and peripheral blood was positive for VZV DNA [8]. Three cases of appendicitis in the course of varicella were reported in another study [10]. In 2017, a case of a five-year-old girl with diagnosed DiGeorge syndrome and prolonged varicella was reported to develop perforated appendicitis and an intraperitoneal abscess. Tissue from the appendix and pus from the abscess were positive for VZV DNA by PCR. The child was successfully treated with antivirals, antibiotics, and drainage after two weeks [11]. The last case report described an immunocompetent six-year-old girl who was admitted with a perforated appendix in the course of antiviral treatment for the active phase of VZV. She underwent laparoscopic appendectomy, but PCR from appendix tissue was negative for VZV DNA [4].

This case report provides valuable insights into the rare but devastating potential of VZV infection in an immunocompetent young adult, particularly when complicated by appendicitis and pneumonia. While VZV complications are well-documented in immunocompromised hosts, fatal outcomes in healthy individuals remain exceedingly rare. This case highlights an unusual progression to septic shock and multiorgan failure, emphasizing that even routine infections and surgeries can have catastrophic consequences. The use of PCR for VZV detection in peripheral blood strengthens the diagnosis, ruling out other differentials (e.g., drug rash or bacterial sepsis). This underscores the importance of molecular diagnostics in atypical presentations. However, some limitations must be acknowledged. As a single observation, this report cannot establish causality or prevalence. The patient’s fatal outcome may reflect an idiosyncratic immune response rather than a broadly applicable clinical pattern. Since VZV lesions appeared post-appendectomy, it is unclear whether earlier empiric acyclovir (e.g., preoperatively, if prodromal symptoms existed) could have altered the outcome. Delayed antiviral therapy in disseminated VZV is associated with higher mortality, but this case does not definitively prove that timing was the critical factor.

Conclusion

This case highlights the potentially fatal trajectory of VZV infection in an immunocompetent host, exacerbated by concurrent appendicitis and surgical stress, which may have facilitated systemic dissemination. The rapid progression to viremia, multiorgan involvement, and septic shock underscores the virus’s capacity for severe immunomodulation—even in healthy adults—possibly through unchecked cytokine release or secondary bacterial translocation. The primary takeaway lesson is that VZV, though often dismissed as benign in children, demands vigilant monitoring in adults, particularly when comorbidities (e.g., surgery or acute inflammation) are present. Early empiric antiviral therapy, aggressive

supportive care, and heightened suspicion for atypical presentations (e.g., postoperative rash or hepatitis) are critical to mitigating mortality in such rare but devastating scenarios.

Abbreviations

ALP	Alkaline phosphatase
ALT	Alanine transaminase
AST	Aspartate aminotransferase
CRP	C-reactive protein
ESR	Erythrocyte sedimentation rate
HRCT	High-resolution computed tomography
ICU	Intensive care unit
INR	International normalized ratio
LVEF	Left ventricular ejection fraction
PCR	Polymerase chain reaction
PTT	Partial thromboplastin time
VBG	Venous blood gas
VZV	Varicella-zoster virus
WBC	White blood cell

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Ethics approval and consent to participate

The patient's parents provided written informed consent for the publication of this case report and any accompanying images.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the editor-in-chief of this journal.

Availability of data and materials

All relevant data are within the paper.

Authors' contribution

Conceptualization: Hesamoddin Hosseinjani, Mahnaz Arian. Data Curation: Farshad Abedi, Mahnaz Arian. Formal Analysis: Masoumeh Gharib, Saeid Amel Jamehdar. Funding Acquisition: Mahnaz Arian. Investigation: Farshad Abedi, Mahnaz Arian. Methodology: Masoumeh Gharib, Saeid Amel Jamehdar. Project Administration: Reza Pourahmadazar, Mahnaz Arian. Supervision: Mahnaz Arian. Writing–original draft: Farshad Abedi. Writing–review & editing: Hesamoddin Hosseinjani, Mahnaz Arian.

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