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Pancytopenia Complicating Varicella

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Abstract

Background: Varicella, or chickenpox, is a common viral infection caused by the varicella-zoster virus (VZV). While typically self-limiting, it can lead to severe complications, particularly in immunocompromised individuals. Haematological abnormalities, such as thrombocytopenia, are well-documented, but pancytopenia remains extremely rare, especially in immunocompetent children. *Case Report*: We present a case of an 11-year-old female with varicella complicated by pancytopenia. The patient developed high fever, vesicular rash, hepatosplenomegaly, and altered sensorium, requiring hospitalization. Laboratory investigations confirmed pancytopenia without atypical cells or hemolysis. The patient received intravenous acyclovir and ceftriaxone, leading to gradual recovery. *Conclusion*: Pancytopenia as a complication of varicella is rare and may be underreported. Early diagnosis and supportive management are crucial for favourable outcomes.

Keywords: Acyclovir, Encephalitis, Fever, Rash, Thrombocytopenia.

Introduction

Varicella, commonly known as chickenpox, is a highly contagious viral infection caused by the Varicella-Zoster Virus (VZV). It typically presents with fever and a characteristic vesicular rash, which follows a centripetal distribution. Although varicella is often self-limiting, complications can arise, particularly in immunocompromised individuals, pregnant women, and infants. Among the various complications, hematological abnormalities such as thrombocytopenia are well-documented, while pancytopenia remains exceedingly rare. The exact pathophysiology behind varicella-induced pancytopenia is unclear but may involve bone marrow suppression or immune-mediated destruction of blood cells. Since hematological complications are often asymptomatic and transient, they may be underreported.

Here, we present a case of an 11-year-old immunocompetent female who developed pancytopenia as a complication of varicella. This case highlights the importance of early recognition, appropriate supportive management, and the role of varicella vaccination in preventing severe outcomes.

Case Report

An 11-year-old female presented with a ten-day history of fever accompanied by vesicular rashes that initially appeared on the neck and trunk before spreading across the entire body within three days. The fever was associated with abdominal pain and malaise. The patient's mother had experienced a similar self-resolving illness a week earlier. On the fourth day of illness, the patient developed altered sensorium, prompting admission to a local district hospital, where she was initiated on intravenous acyclovir and ceftriaxone. By the fifth day, her sensorium improved; however, she continued to experience high-grade fever (103-104°F) and abdominal pain. A complete blood count (CBC) revealed pancytopenia, leading to her referral for further management.

Upon admission, the patient had scabbed varicella lesions covering her body but was hemodynamically stable. Examination revealed pallor, tender hepatomegaly, and splenomegaly. Repeat CBC with peripheral smear confirmed pancytopenia with 0.5% reticulocytes and no atypical cells, suggesting varicella encephalitis with pancytopenia **[Table 1]**. Hemolysis was ruled out through direct Coombs test and lactate dehydrogenase (LDH) levels **[Table 2]**. The patient was continued on intravenous acyclovir and ceftriaxone.

After ten days of intravenous acyclovir, the patient's clinical condition improved, and her pancytopenia began to resolve. She was subsequently discharged in stable condition.

Table 1: *Hematological profile over the course of illness.*

Day of Presentation	Hemoglobin (g/dL)/ Hematocrit (%)	Total Leucocyte Count (cells/µL)	Differential Leucocyte Count (%) (N/L/M/E*)	Platelet Count (µL)
Day 1	8.7/ 24.8	1600	21/ 73/ 5/1	16,000
Day 2	7.9/ 23	2100	17/ 80/ 2/1	21,000
Day 3	7.6/ 22.4	2500	14/ 81/ 2/3	27,000
Day 6	8.6/ 26.4	3760	21/ 77/ 1/1	62,000
Day 9	9.1/ 28.4	13,000	13/ 82/ 3/2	88,000

*Neutrophils/lymphocytes/monocytes/eosinophils.

Table 2: *Biochemical investigations.*

Parameter	Value
LDH (IU/L)	324
Uric Acid (mg/dL)	4
Total Bilirubin/ Direct Bilirubin (mg/dL)	0.4/ 0.04
AST/ ALT (IU/L)	98/ 55
Total Protein/ Serum Albumin (g/dL)	7.8/ 3.4
HIV	Non-reactive
HBsAg	Non-reactive
Anti-HCV	Non-reactive

Discussion

Varicella, commonly known as chickenpox, is a highly contagious viral illness caused by the Varicella-Zoster Virus (VZV). It presents with a polymorphic vesicular rash in a centripetal distribution. The exact incidence of varicella in India remains uncertain due to underreporting, but between January 2015 and May 2021, 1,269 outbreaks were documented, accounting for 27,257 cases [1]. Though varicella is usually self-limiting, it can lead to complications, particularly in immunocompromised individuals, infants, and pregnant women. Severe complications include pneumonia, encephalitis, cerebellitis, hematological abnormalities, and secondary bacterial infections. In a five-year retrospective study, Koturoğlu G *et al*. found that 41.9% of complications were infectious, 35.6% were neurological, and only 3.6% were hematological, with thrombocytopenia being the most common [2]. Pancytopenia remains a rare complication.

Although thrombocytopenia is a well-documented complication of varicella, pancytopenia is extremely rare, especially in immunocompetent children. Most cases are self-limiting, as seen in our patient. However, some cases may indicate underlying immune dysfunction. Kakish K *et al*. reported a case of aplastic anemia post-varicella, refractory to IVIG and steroids, requiring bone marrow transplantation [5]. Conversely, varicella has been observed to stimulate bone marrow function in patients with pre-existing hematological disorders [6]. However, it has also been linked to post-viral hematological malignancies, such as acute lymphocytic leukemia (ALL) [7].

The underlying pathophysiology of these hematological complications remains unclear. Thrombocytopenia may result from immune-mediated platelet destruction or molecular mimicry [8]. Varicella-associated anemia can be hemolytic (due to anti-I, anti-Pr cold agglutinins, or anti-DC antibodies) or secondary to bone marrow suppression [9]. A study by Elena B *et al*. found that hematological complications were the most common among hospitalized pediatric varicella cases, differing from previous studies [10]. Since

many cases remain asymptomatic or transient, they often go undiagnosed, leading to potential underreporting. Nonetheless, careful monitoring is crucial to detect life-threatening complications, such as severe bleeding and infections. Routine varicella vaccination must be encouraged to prevent complications, particularly in children with no contraindications. Timely diagnosis and management of complications can significantly improve clinical outcomes.

Conclusion

Pancytopenia in varicella is a rare but significant complication. Early recognition and appropriate supportive care, including antiviral therapy, can lead to a favourable prognosis. Routine varicella vaccination remains the most effective preventive measure.

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