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CASE REPORT

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Parallel pathogens: Coexistence of chickenpox and idiopathic thrombocytopenic purpura—A case report

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Key Clinical Message

This case report documents the unusual co-occurrence of immune thrombocytopena (ITP) and chickenpox in a 15-year-old girl. Initial symptoms included shortness of breath, chest pain, and heavy menstrual bleeding. Laboratory results revealed significant anemia and thrombocytopenia. Treatment involved blood transfusions, prednisolone, and iron supplementation. The patient's vesicular skin rash emerged 8 weeks later, prompting the combined diagnosis of ITP and chickenpox. Antiviral treatments, blood transfusions, and supportive care were used in the course of treatment, leading to full recovery. This case emphasizes the importance of prompt diagnosis, appropriate management, and regular follow-up for patients with both chickenpox and ITP. The coexistence of chickenpox and ITP poses a clinical challenge due to the complex interaction between the viral infection and the immune system. The exact mechanism linking these two conditions remains unclear, making it a baffling case that warrants investigation and further understanding. As low is the occurrence of hemorrhagic chickenpox, the presentation of simultaneous chicken pox with or following ITP was found to be rarer, and thus is this enigmatic case presented. Healthcare providers should remain vigilant about such co-occurrences to prevent complications. In order to improve treatment for instances with comparable clinical presentations and advance our collective knowledge, further study is required to better understand the mechanisms relating viral infections and ITP.

KEYWORDS

chickenpox, ITP, purpura

1 | INTRODUCTION

Varicella-zoster virus (VZV) causes a harmless viral rash known as chickenpox, which typically does not require treatment but it can occasionally lead to complications. Chickenpox is commonly linked to mild thrombocytopenia in children, but severe thrombocytopenia resulting in bleeding is uncommon.[1] Immune Thrombocytopenia

(ITP) is a blood disorder in which platelets are destroyed through immune-mediated mechanisms, resulting in low platelets number which is characterized by a platelet count that is less than 100 × 109/L.[2] ITP is frequently triggered by viral infections and/or live virus vaccinations.[3] The condition manifests as the sudden onset of acute, self-limiting attacks of bleeding, which are typically minor but can sometimes result in intracranial hemorrhage (ICH). Compared to other thrombocytopenias caused by decreased platelet production, ITP typically results in less severe bleeding. The diagnosis of ITP is typically made based on clinical presentation and laboratory findings and is a diagnosis of exclusion.[4] Treating children with ITP aims to raise their platelet count to a safer level that is less risky to prevent severe bleeding, particularly ICH.[5] Since the 1950s, corticosteroids have been effectively utilized. The effects of corticosteroids are caused by a reduction in the production of antiplatelet antibodies and a decrease in the clearance of opsonized platelets. Imbach et al introduced intravenous immunoglobulin (IVIG) for the treatment of ITP in children, and it has been proven that IVIG is highly efficient in increasing platelet counts in over 80% of patients. Additionally, IVIG acts more quickly than steroids.[6] We report a case of chickenpox with simultaneous ITP purpura.

2 | CASE REPORT

We present the case of a 15-year-old girl with no significant medical history who was admitted to the hospital for 2 weeks with chief complaints of shortness of breath, right-sided chest pain, and sudden dizziness.

2.1 | Initial presentation and first hospitalization

2.1.1 | Chief complaints

The patient was admitted with the complaints of shortness of breath, right-sided chest pain, and sudden dizziness. She mentioned of heavy menstrual loss a day prior to the onset of these symptoms.

No recent sick contacts, travel, or medication use was stated.

2.1.2 | Physical examination findings

On physical examination, she had anicteric sclera, severe conjunctival pallor, normoactive bowel sounds, and a non-tender, non-distended abdomen without hepatosplenomegaly. She was afebrile (37.6°C), her blood pressure was 80/46 mmHg, her heart rate was 120 beats per minute (bpm), and her respiratory rate was 32 breaths per minute (bpm).

2.1.3 | Laboratory findings

Based on the patient complaints and the physical examination findings, the physician suggested the patient get some clinical laboratory tests done on the same day of admission. Investigations showed microcytic hypochromic anemia (possibly due to iron deficiency) with thrombocytopenia in PBF, serum ferritin5.16 ng/mL hemoglobin 7.3 g/dL, ESR 85 mm/1 hour, platelet counts 15,000/cu.mm, RBC count 3.03 million/cu.mm with HCT/PCV 24%, HBsAg (ICT) negative, HIV 1&2 negative.

2.1.4 | Management strategies

The patient received one unit of blood transfusion on the day of admission. Subsequently, she underwent conservative management, which included 2 units of blood transfusion over the next two consecutive days. In addition to the transfusions, the patient was prescribed medications, including tablet prednisolone, capsule ferrous sulfate with zinc and folic acid, and other symptomatic treatments. Her anemia showed gradual improvement with this treatment regimen. She was discharged after 8 days when her hemoglobin levels reached 12.0 g/dL, and her erythrocyte sedimentation rate (ESR) was reduced to 15 mm/1st hr. The medical team recommended regular follow-up.

2.2 | Second presentation: Eight weeks later

2.2.1 | Chief complaints

The patient presented with recurring symptoms after an eight-week interval, including shortness of breath, right-sided chest pain, and sudden dizziness, following heavy menstrual blood loss. Additionally, she exhibited a vesicular skin rash on her face, neck, and chest that had developed 2 days before admission. Figure 1.

2.2.2 | Physical examination findings

During the physical examination, the patient exhibited the following characteristics: clear, anicteric sclera;

severe conjunctival pallor; normal bowel sounds; and a non-tender, non-distended abdomen without evidence of hepatosplenomegaly. She maintained a normal body temperature of 37°C, with a blood pressure of 90/60 mmHg, a heart rate of 92 bpm, and a respiratory rate of 28 bpm. Additionally, multiple vesicular skin rashes measuring 2–4 mm were observed on her face, neck, and chest region.

2.2.3 | Laboratory findings

The initial laboratory assessment revealed a hemoglobin level of 5.6 grams/dL, an ESR of 72 mm/1 hour a red blood cell (RBC) count of 2.11 million/cu.mm, a hematocrit (HCT) or packed cell volume (PCV) of 87%, a total platelet count of 47,000/cu.mm, and mild leukocytosis. The peripheral blood film (PBF) and bone marrow study indicated a diagnosis of ITP. Abdominal ultrasound results were normal, and the patient tested negative for HBsAg. Immunological reports, including ANA and anti-dsDNA, were unremarkable. A CT scan and biochemical blood studies showed no abnormalities. Table 1.

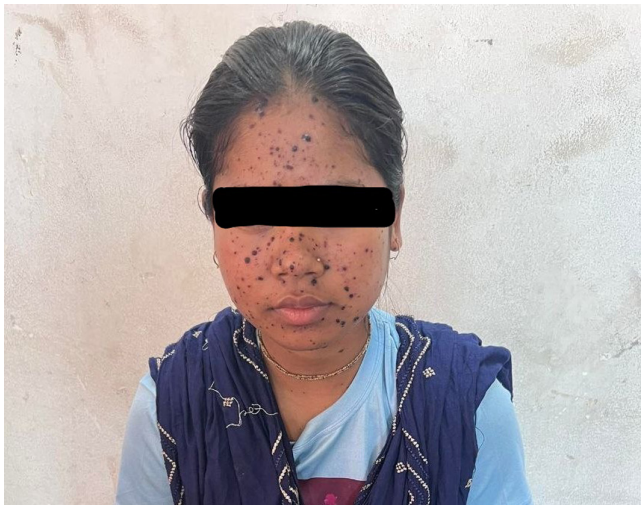

FIGURE 1 Maculopapular rashes showing over the face.

TABLE 1 Bone marrow biopsy report.

Morphology	Remarks
Cellularity	Hypercellular marrow
M:E ratio	Decreased
Erythropoiesis	Hyperactive and show micro and macro normoblastic change
Granulopoiesis	Active and shows mature into segmented form
Megakaryocytes	Increased in number and left shift

2.2.4 | Diagnosis

Based on the clinical presentation and laboratory findings, a clinical diagnosis of chickenpox with underlying ITP was established.

2.2.5 | Management strategies

Treatment included Acyclovir, paracetamol, antihistamines, hydration, and folic acid + zinc for the management of chickenpox. Due to severe anemia, 3 units of blood transfusion were administered. Gradually, the patient's condition improved, with resolution of anemia, and chickenpox symptoms. All other laboratory parameters returned to normal and the patient was discharged after 19 days with instructions for regular follow-up.

3 | DISCUSSION

This case report presents the clinical course and management of a 15-year-old girl who was diagnosed with chicken pox and simultaneous ITP. Chicken pox is a highly contagious, self-limiting, exanthematous infection caused by VZV.[7] While chickenpox is typically a mild and self-limiting disease in healthy children, severity of complication is higher among adults and those who are immunocompromised. One of the hematological complications reported is ITP.[8] Several studies have shown the association between chickenpox and ITP in both children and adults.[1,9] In this case, we presented a rare occurrence of simultaneous chickenpox and ITP. In review of literature, we found a single case reported with a similar case scenario where a 11-year-old boy presented with hemorrhagic vesicular rashes, petechiae, ecchymosis, epistaxis, hematuria and melena, dated back in 1947.[10] In our case, limited availability of similar studies has imposed significant limitations in terms of evidence-based decision-making, diagnostic accuracy and patient management.

ITP is defined as the isolated platelet count below 100,000/μL without other hematological abnormalities.[11] Although, ITP occur both in acute and chronic form, around 80% of childhood disease are of acute manifestation.[8] It usually presents with ecchymosis, petechiae, mucosal bleeding, nasal bleeding and excessive menstrual bleeding in case of female. However, sometimes it may be an incidental finding without any bleeding manifestation.[12] The pathogenesis of ITP is not fully understood, and the exact cause remains unclear. However, the known etiopathogenesis include production of autoantibodies that target platelet surface glycoproteins resulting in accelerated platelet clearance by macrophages, impaired

platelet production in bone marrow and increased reactivity of T cells against platelets.[13] The concept of molecular mimicry was suggested, implying the relationship between VZV antigen and platelet capsular protein, wherein antibodies initially produced against varicella infection cross react with platelets.[14] In this case, presence of anemia alongside ITP also raised the possibility of immune mediated mechanism causing anemia. To further investigate such case, Coombs test to evaluate the presence of immune mediated hemolysis could have been done.

According to the recommendation from American Society of Hematology (ASH) corticosteroids are considered as the first line therapy for ITP. However, in cases where corticosteroids are contraindicated ASH guideline suggest considering intravenous immunoglobulin or anti D immunoglobulin as alternative treatment options.[2] Comparing the two modalities, systematic review and meta-analysis conducted by Beck CE et.al, concluded that children treated with corticosteroids are 26% less likely to rise platelet level than those who are treated with intravenous IVIG.[15] Despite this, corticosteroids are usually the first choice due to ease of administration and low cost.[16] Thrombopoietin receptor agonist such as eltrombopag and romiplostim, anti CD20 antibody rituximab and surgical splenectomy are considered as second line therapies for the cases lasting more than 3 months and not responding to first line therapies.[2] While bone marrow transplantation has shown promise as a potential treatment option in cases where other modalities have failed, its complexity and possible complications currently prevent it from being considered a standard treatment approach.[17,18]

Simultaneous occurrence of chicken pox demands comprehensive evaluation. In order to rule out any potential neurological complications, CT scan was performed, although it is worth noting that such complications are rare but have been reported in association with chickenpox.[19] CDC recommends antiviral therapy for the unvaccinated children older than 12 years old and therefore acyclovir was initiated along with supportive measures. Intravenous acyclovir given within 72 h of disease onset is considered very effective especially for those who are at risk of severe disease.[10]

This case report highlights the importance of timely diagnosis, appropriate management strategies such as supportive care, antiviral treatment and blood transfusions and regular follow up in achieving successful outcomes. Health care providers should be vigilant about the co-occurrence of these diseases so that timely intervention can be done to prevent possible complications. Further reporting of similar cases and research are warranted to better understand the underlying mechanisms linking viral infections and ITP and to optimize the management of these dual diagnoses.

4 | CONCLUSION

In conclusion, this case report highlights a rare and intriguing occurrence of simultaneous chickenpox and ITP in a 15-year-old girl. A careful review of the patient's clinical presentation, laboratory data, and exclusion of additional potential causes of thrombocytopenia established the diagnosis of ITP. The patient had typical ITP symptoms, such as rashes and a considerable reduction in platelet count. Prompt identification and comprehensive care played a pivotal role in our patient's recovery. The multimodal treatment approach involving blood transfusions, corticosteroids, and IVIG therapy led to a rapid improvement in her platelet count, resulting in a full recovery from both chickenpox and ITP.

However, this case should also serve as a call to action for the medical community. It is essential that we continue to investigate and understand the underlying processes that connect chickenpox and ITP. Further research is warranted to uncover the etiology and mechanisms at play in these co-occurring conditions. Larger, more comprehensive studies are needed to determine the most effective treatment strategies for individuals facing this unique combination of illnesses. Moreover, clinicians should remain vigilant when encountering cases that present with similar clinical features, as timely diagnosis and appropriate intervention can significantly impact patient outcomes. By reporting and sharing such cases through publications and medical networks, we can collectively expand our knowledge and improve our ability to provide comprehensive care for patients with similar complex clinical profiles. This case underscores the importance of ongoing research and clinical vigilance in advancing our understanding and management of rare medical conditions.

AUTHOR CONTRIBUTIONS

Abhigan Babu Shrestha: Visualization; writing – review and editing. **Anuj Yadav**: Writing – original draft; writing – review and editing. **Sadish Sharma:** Investigation; methodology; writing – original draft. **Unnat Hamal Sapkota:** Writing – original draft. **Mohamad Ali Farho:** Writing – review and editing. **Md. Moududul Isalam:** Writing – review and editing. **Md. Ibn Abu Sayem:** Writing – review and editing. **Md. Nuruzzaman:** Supervision.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

DATA AVAILABILITY STATEMENT

data will be available on request to the corresponding author.

ETHICS STATEMENT

N/A

CONSENT

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

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