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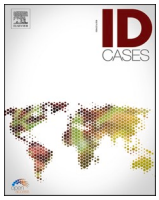

Case report

Varicella pneumonia in an immunocompetent child: A case report

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ABSTRACT

Varicella-zoster virus (VZV) is a type of herpes virus that causes varicella (primary infection) and herpes zoster/shingles (due to reactivation of latent infection). Usually a benign and a self-limited illness, the illness sometimes can result in severe complications in both immunocompetent and immunocompromised persons. Varicella Pneumonia as a complication of herpes zoster is a rare event, with reports primarily concerning immunocompromised individuals. Here we report a 14-year-old female who developed a secondary bacterial infection of the skin lesions and varicella pneumonia associated with VZV infection. The patient presented with multiple painful vesicles that later turned into pustular lesions over the right cheek with erosions and hemorrhagic crusting. Swelling involving the right half of both upper and lower lips was present. She developed a fever, cough, and shortness of breath after two days of the presence of vesico-pustular lesions. A diagnosis of Pneumonia was made based on symptoms of fever and cough and findings on chest x-ray. This case highlights, though rare, varicella pneumonia has a high rate of respiratory failure, but early diagnosis with prompt administration of antiviral medications can improve outcomes.

Introduction

Varicella-zoster virus, a herpes virus, causes varicella (chickenpox) and, after endogenous reactivation, herpes zoster (shingles) [1]. Replication and transmission of the virus in the nerves and skin lead to the cardinal features of herpes zoster—pain and rash. In some people, the rash is preceded by a prodromal phase lasting 48–72 h or longer, consisting of throbbing pain and paresthesia in the region of the affected sensory nerve. Diagnosis is usually based on the characteristic varicella rash, which is vesicular, covers a single dermatome, and lasts for three to five days [2]. In immunocompetent patients, the most frequent site of reactivation is the thoracic nerves followed by the ophthalmic division of the trigeminal nerve (herpes zoster ophthalmicus), which can progress to involve all structures of the eye [3]. The most common complication is a secondary bacterial infection, followed by other severe complications including pneumonia, encephalitis, myelitis, retinitis, hemiparesis, hepatitis, and disseminated intravascular coagulopathy, which are more common in immunocompromised patients, such as transplant recipients and patients with acquired immune deficiency syndrome (AIDS) [1]. The occurrence of varicella pneumonia in association with VZV infection is very rare. Here, we present a case of pneumonia associated with VZV infection in an immunocompetent child.

Case

A 14-year female developed multiple, painful, vesicles on an erythematous base on the right side of the cheek and chin. There was a history of fever with chills 3 days after the appearance of vesicles which later turned into pustules. Later on, there was crusting dark-brown to hemorrhagic, ill-defined swelling of the face mostly involving right sided perioral region extending from the lower border of the zygoma to the inferior border of the mandible with few pus points present over the right side of the upper and lower lip, cheek and buccal mucosa involving the maxillary and mandibular branches of the right trigeminal nerve. Edema also involved the dangerous area of the face (Fig. 1a,b). The patient also developed a dry cough and shortness of breath. She presented to the pediatric emergency of B.P. Koirala Institute of Health

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Sciences, Nepal. Upon admission, the physical examination showed a pulse rate of 90 beats/min, blood pressure of 120/70 mmHg, body temperature of 102°F, and a respiration rate of 40 breaths/min. Pulse oximetry showed a 94% O_2 saturation in room air. Chest auscultation revealed bilateral decreased air entry with crepitation in bilateral lower lobes. The abdomen was soft, non-tender, and non-distended. There was no history of headache, loss of consciousness, and abnormal body movements. No history of abdominal pain, or yellowish discoloration of the body. The bowel and bladder habits were normal. Laboratory analysis of blood tests showed a decrease in total leucocyte count (Table 1). Chest X-ray revealed bilateral opacifications with infiltration across all lung fields (Fig. 2). Arterial blood gas analysis revealed respiratory alkalosis with a pH of 7.514.

The patient was fasted upon admission and was administered intravenous fluids. She was administered oxygen using a face mask and the saturation was maintained. A dermatology consultation was done in view of facial skin lesions. Oral medicine consultation was done. She was administered empirical intravenous antibiotics (Meropenem 40 mg/kg/dose q8h, Vancomycin 15 mg/kg/dose q8h, Clindamycin 10 mg/kg/dose q8h) for secondary bacterial infection, antiviral (acyclovir 10 mg/kg), Injection Paracetamol 500 mg q6h, Injection Pantoprazole 40 mg q12h, ointment mupirocin local application q12h. The patient was treated for 6 days in the pediatric intensive care unit. The fever subsided over the next few days. Upon improvement, she was shifted to the ward where antibiotics and required medications were continued for the next 4 days. Oral intake improved gradually and upon request, the patient was discharged on oral medications after 10 days of admission. On discharge, there was no fever or shortness of breath. The vitals were stable. Chest auscultation revealed bilateral decreased breath sounds with crackles heard. The oxygen saturation was 97% in room air. The patient remained well during the one-month follow-up.

Table 1
Laboratory investigations of the patient and their results.

Name of Investigation	Results
Hb, g/dl	10.9
Hematocrit %	33.5
WBC, count/ml	3890
DLC %	N58L35M05E02
Platelets, count/ml	1,04,000
Total Protein, g/l	6.2
Total Serum Bilirubin, mg/dl	4.82
Direct Serum Bilirubin, mg/dl	2.6
ALT/AST/ALP, Units/L	68/108/224
Urea/Creatinine, mg/dl	27.7/0.3
Sodium/Potassium, mmol/L	133/4.7
PT/INR	13/1.08
Blood Culture and Sensitivity	STERILE
Blood Group	B POSITIVE

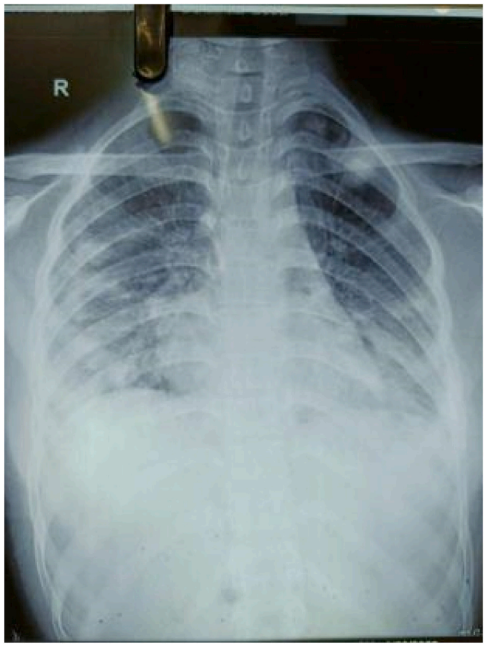

Fig. 2. Bilateral opacifications visible on the chest X-ray of the patient.

Discussion

Although uncommon, varicella pneumonia can develop as a consequence of herpes zoster in immunocompetent individuals. In our case report, we described a 14-year-old girl who contracted the varicella-zoster virus (VZV) and subsequently developed varicella pneumonia. Initially, the patient exhibited typical varicella symptoms, including painful, pustular lesions on the right cheek that eventually spread to the lips and buccal mucosa. Within a week of the rash and fever onset, she began experiencing respiratory issues, such as coughing and shortness of breath. Symptoms of varicella pneumonia typically include shortness of breath, persistent fever, and cough. In some cases, additional symptoms such as cyanosis, hemoptysis, and pleuritic chest pain may occur [4]. Fortunately, this patient did not present with chest pain or hemoptysis. Pneumonia was diagnosed based on clinical symptoms and the findings from a chest X-ray. The varicella-zoster virus belongs to the herpesvirus family and is responsible for both varicella (chickenpox) during primary infection and herpes zoster (shingles) upon reactivation of latent

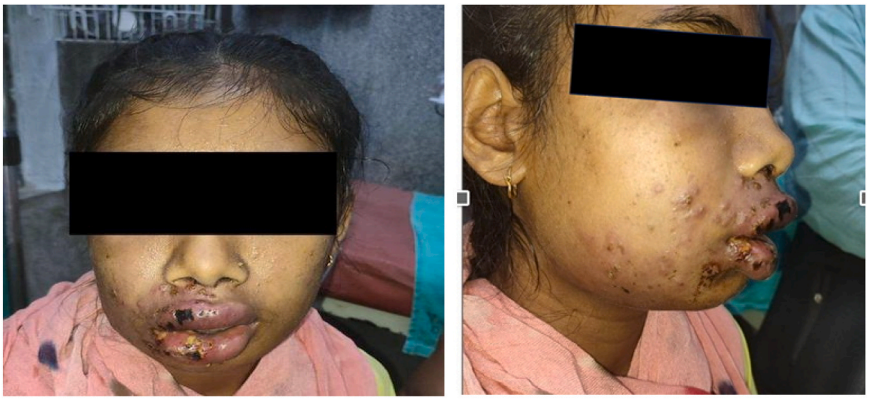

Fig. 1. a: Swelling of the perioral region with some crusted lesions. b: Pustular lesions in the area of maxillary and mandibular branches of the right trigeminal nerve. Some lesions appear crusted.

infection. Herpes zoster symptoms, such as pain and rash, are caused by the virus's replication and transmission in the nerves and skin. The typical vesicular rash, which covers a single dermatome and lasts for three to five days, serves as the basis for diagnosis [5]. The thoracic nerves and the ophthalmic segment of the trigeminal nerve (herpes zoster ophthalmicus), which can affect numerous eye components, are the most common sites of herpes zoster reactivation in immunocompetent patients.

Varicella pneumonia, an uncommon manifestation of VZV infection, is more frequently seen in immunocompromised people, such as transplant recipients and AIDS patients. Our case report, however, emphasizes the extremely uncommon occurrence of varicella pneumonia in an immunocompetent youngster. According to estimates, 5–15% of adults with immunocompetent individuals who have chickenpox go on to develop varicella pneumonia [6,7].

Varicella pneumonia symptoms often appear a week after the onset of rash and fever. Coughing, a lingering fever, and shortness of breath are all typical respiratory symptoms. Additional symptoms like hemoptysis, cyanosis, and pleuritic chest discomfort might occasionally manifest as well. Thankfully, our patient did not display signs like hemoptysis or chest pain. The recommended antiviral medication for VZV infections, intravenous acyclovir, produced a favorable response with symptom improvement over the period of hospitalization.

In order to effectively treat varicella pneumonia, early diagnosis, and quick antiviral treatment administration are essential. Early diagnosis and treatment are crucial for improving outcomes and minimizing complications related to varicella pneumonia, according to a number of studies [8,9]. Acyclovir was administered intravenously to the patient in our situation, which successfully reduced viral replication and helped the patient's symptoms go away. Treatment options for varicella pneumonia have also been explored, including valacyclovir and famciclovir.

Conclusion

In conclusion, immunocompetent patients who come with herpes zoster and respiratory symptoms should be evaluated for varicella pneumonia even though it is a rare complication. In cases with varicella pneumonia, rapid antiviral medication delivery and early diagnosis are essential for enhancing results. Our case report emphasizes how critical timely diagnosis and effective treatment are to helping varicella pneumonia patients recover successfully.

Ethical approval

Not applicable.

Consent for publication

Informed consent was taken from the patient to publish this case report.

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Author's contribution

SK provided us with data and materials from the archive and their notes. PSY, PA, and NMJ wrote the manuscript, collected the images, and put them in perspective according to the timeline of the case. MB and SK reviewed the manuscript and did the final editing. SS provides the dermatological expertise. All the authors read the final manuscript and approved the case.

Declaration of Competing Interest

The authors declare that they have no competing interests.

Data Availability

The datasets supporting the conclusions of this article are included within the article.

Acknowledgment

None.

Registration of research studies

This is a case report so registration was not required.

Guarantor

All the authors are the guarantor of the study.

Provenance and peer review

Not commissioned or externally peer-reviewed.

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