VARICELLA AND INFLUENZA A (H1N1) PDM09 (SWINE FLU) CO-INFECTION IN A CHILD - CASE REPORT

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ABSTRACT

Infectious diseases are the leading cause of mortality in children in tropical countries. Co-infections are also common in tropical countries like India. Superimposition of the clinical features of dual infection, may cause diagnostic difficulties to the treating clinician. In India there has been a resurgence of Influenza A (H1N1) pdm09 throughout all states since a decade. At the same time, varicella outbreaks are also common in India. As both infections are endemic in India, it is possible that a child can be simultaneously infected with both infections. We are reporting a 2-year old child who presented with varicella infection and developed respiratory symptoms after admission. In view of an outbreak, a nasopharyngeal swab reverse transcriptase polymerase chain reaction (RT-PCR) for influenza was done and Influenza A (H1N1) pdm09 was detected.

Key Words: Co-Infection, Varicella, Influenza A (H1N1) pdm09

INTRODUCTION

Infectious diseases remain the leading cause of mortality in children 1 month to 9 years of age throughout the world(1,2) Occurrence of co-infections *is also common in tropical regions* in various combinations (2). Coinfections will have overlapping clinical features and pose diagnostic challenges for the management of febrile illnesses to the clinician (2).There has been a resurgence of Influenza A (H1N1) pdm09 in 2024 throughout India. In the year 2024, from January to end of October, 19872 cases of Influenza A (H1N1) pdm09 have been reported and out of which 324 patients expired (3).In India, 1269 chickenpox outbreaks (27,257 cases and 31 deaths) have been reported between Jan 2015 and May 2021 (4).As both varicella and Influenza A (H1N1) pdm09 are endemic in India, it is possible that a child can be simultaneously infected with both infections. We report a child with varicella who developed respiratory symptoms like cough and tachypnea after admission, and proved positive for Influenza A (H1N1) pdm09 on a nasopharyngeal swab RT-PCR. A consent for publication was obtained from the parents of the patient.

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CASE REPORT

A 2 year- old boy presented with rash and fever since 3 days and seizures since 2 days in January 2025. The rash started on the abdomen and thorax, and later spread to the extremities including the face. Ten hours later he developed fever as well. Rashes were macular in the beginning, then papular and vesicular in nature. On the second day of fever he had two episodes of generalized tonic clonic seizures lasting for 2 minutes with an interval of 1 hour. A history of contact with chickenpox was present. His vitals at admission were as follows: temperature 102^0F (38.8^0C), respiratory rate (RR) 48/minute, pulse rate (PR) 126/minute, capillary filling time (CFT) 2 seconds, saturation of 99% and blood pressure (BP) - 106/66 mm Hg. Skin examination revealed macular and papular rashes and vesicles all over the body [Fig 1 A, B]. The CNS examination showed: Glasgow Coma Scale (GCS) 14/15, no signs of meningeal irritation or cranial nerve involvement, normal tone and reflexes. Other systems examination was unremarkable. The provisional diagnosis was varicella with febrile seizures/encephalitis. Investigations are depicted in the table 1. Treatment included paracetamol 10 mg/kg/dose 6^{th} hourly, iv fluids and iv acyclovir 10 mg/kg/dose 8^{th} hourly . In the next 12 hours, the patent continued to have fever spikes, together with cough, nasal block with tachypnoea (RR 54/minute), and GCS 15. In view of the respiratory symptoms occurring in a varicella child, the diagnosis was revised as pneumonia due to a secondary bacterial infection/ varicella virus pneumonia (chickenpox pneumonia) / Influenza pneumonia. Therefore, inj ceftriaxone 100mg/kg/day in 2 divided doses added. The chest x-ray was suggestive of bronchopneumonia [Fig 1 D]. After a nasopharyngeal swab RT-PCR proved positive for H1N1, oral Oseltamivir 30 mg twice daily was given. By 48 hours, the child was active, afebrile with normal respiration and scabs present in the skin [Fig 1 C]. He was discharged after 5 days of ceftriaxone and Oseltamivir therapy.

Table 1:-Investigations

Investigations[Reference range]	**At admission**	**Day 2**	**Day 3**
Hemoglobin [110-140g/L]	93		94
TLC [5000-15000 cells × 10^9/L/]	8990		8520
DLC [Ne, Ly ,Eo, Mo, Ba] %	58%,4%,1%,6%,1%		10%,85%,2%,2%,1%
Platelet count [1.5-4.5×10^9/L]	1.19		2.29
CRP [0-6 mg/L]	127		
ESR in 1st hour[up to 20 mm]	20		
Blood sugar [3.88-7.77 mmol/L]	4.66		
Serum Calcium[1.14-2.7 mmol/L] Ionic[0.28-1.32]	2.37 0.28		
Serum Magnesium[0.62-1.07 mmol/L]	0.82		
Serum Bilirubin[0.003-0.020 mmol/L]	0.0029		
SGOT(0-35U/L)	45		
SGPT(0-35U/L)	17		
Alkaline phosphase (142-335U/L)	168		\
Serum Albumin[35-52 g/L]	42		
CK-MB[0-4.94 ng/ml]		3.4	
Troponin-T[12.7-24.9 ng/L]		4	
Serum Creatinine[0.008-0.035 mmol/L]	0.035		
Blood Urea[5.7-17.1 mmol/L]	5.35		
Serum Sodium [59.15- 63.07 mmol/L]	58.28		
Serum Potassium[0.89- 1.30 mmol/L]	1.25		
CK-NAC [20-180 U/L]	217		
CSF analysis= 2 cells/mm^3 both lymphocytes, Protein=12 [15-45 mg/dl], Glucose 59 mg/dl, Gram stain negative and culture sterile.			
Serology for Dengue (both NS1 and IgM), HIV and weil-felix are negative.			
Blood and urine cultures sterile. Chest x-ray suggestive of bronchopneumonia			
Serum Varicella Zoster Virus (VZV) antibodies panel by CLIA:- **IgM=>2.30-------Positive** IgG =142.10mIU/ml [Interpretation of the results IgM >1.0 is positive, <1.0 is negative]			
After 24 hours, Nasal swab RT-PCR= **Influenza A(H1N1 pdm09)** detected, Influenza B Not detected.			

TLC (Total Leukocyte Count), DLC (Differential Leukocyte Count),CRP (C-reactive protein) ESR (Erythrocyte Sedimentation Rate) , serum glutamic-oxaloacetic transaminase(SGOT), Serum Glutamate Pyruvate Transaminase(SGPT), Creatine Kinase-MB(CK-MB), Creatine Kinase with N-acetylcysteine (CK-NAC),Varicella Zoster Virus (VZV), Clinical Laboratory Improvement Amendments (CLIA)

DISCUSSION

Diagnosis of varicella is based on the classical features and positive serology for IgM VZV antibodies. The pleomorphic rashes which were present in our patient are characteristic of varicella (5).In immune competent children, temperature up to 102°F can be present for 2 to 3 days (5). On day 4th our patient continued to have fever, and developed cough with tachypnea. Therefore, diagnosis was revised as pneumonia due to a secondary bacterial infection or varicella virus or Influenza virus. A nasopharyngeal RT-PCR test was demanded in view of an influenza outbreak. In immune-competent children , pneumonia due to varicella virus is very rare in comparison to adults (6).Typically, varicella pneumonia occurs within 1 to 6 days after the appearance of the rash with respiratory symptoms of cough, difficulty in breathing and progressive tachypnea (6). A Switzerland study described secondary bacterial infections with Staphylococcus aureus and Streptococcus pyogenes as serious complications in immunocompetent children with varicella (6). The classical chest x-ray findings of VZV pneumonia are nodular bilateral opacifications that appear first toward the outer borders and then spread towards the base and roots of lungs (6). In Influenza A (H1N1) pdm09 pneumonia chest x-ray shows ground-glass opacities and consolidations that has a patchy or nodular appearance. However, classical chest x-ray findings of H1N1 or varicella pneumonia were not present in the current case.

Any patient who presents with symptoms of acute respiratory illness, including at least 2 of the following: fever, cough, sore throat, rhinorrhea, headache, chills & fatigue, diarrhea and vomiting, body aches and joint pains is labeled as influenza (7). The current case was fulfilling the criteria for influenza, and his RT-PCR was positive for Influenza A (H1N1) pdm09 . H1N1Pneumonia is the most serious complication and if not treated on time can lead to death (7).Clinicians should have high index of suspicion to detect Influenza A (H1N1) pdm09 at the earliest, as timely treatment can be lifesaving. The clinical features of secondary bacterial pneumonia are difficult to distinguish from Influenza A

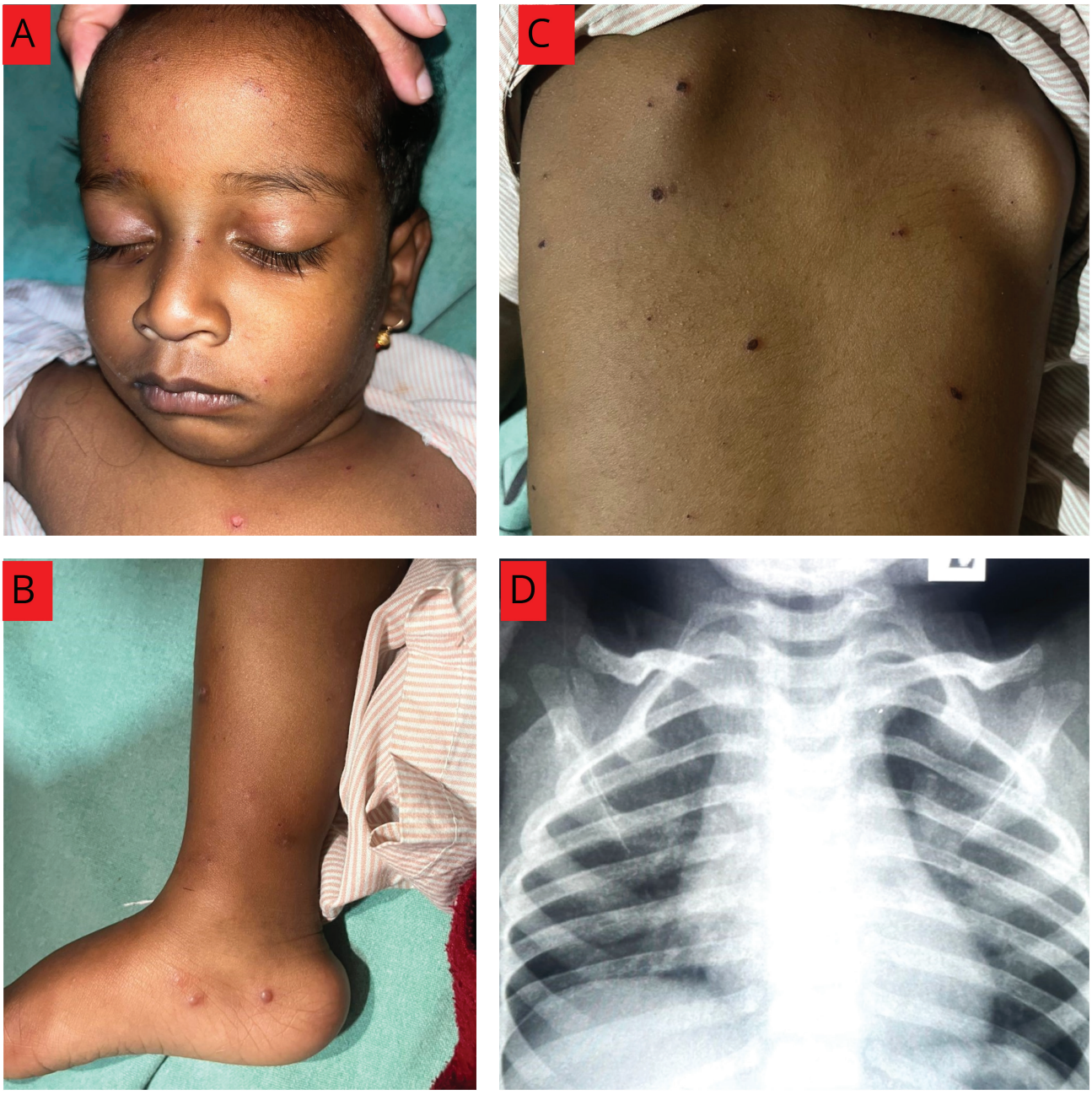

Fig 1. A, B, C: Rashes and scab formation due to varicella infection. **D:** Chest x-ray suggestive of bronchopneumonia

(H1N1) pdm09 pneumonia. We treated simultaneously with ceftriaxone and Oseltamivir for 5 days. After 2 days of treatment, the child was afebrile with normal respiration.

Coinfections may occur in immune-compromised children. However, our patient's serology for HIV was negative. The incubation period for Influenza A (H1N1) pdm09 is 1-4 days with an average of 2 days. Probably he was in the incubation period for Influenza A (H1N1) pdm09 at the onset of varicella, and thus influenza manifested with respiratory features 4 days after the appearance of the varicella rash. In India both varicella and Influenza A (H1N1) pdm09 are endemic and coinfections are possible (3,4). Both infections combined together may lead to a number of complications. Our patient had thrombocytopenia, which can be attributed to both varicella and Influenza A (H1N1) pdm09. After therapy, platelets improved to 2.29 x 10^9/L.

In a study from Congo, out of 1107 monkey pox cases, 134 (12.1%) had varicella coinfections (8). Various other coinfections with varicella like scrub typhus and dengue have been reported. However, a dual infection with H1N1 is rare and only one such report is available in the literature (2,9). Botelho-Nevers et al reported a travel-related H1N1 infection along with varicella after attending a mass festival in Hungary (9). Hukin et al reported a child in whom Reye syndrome was associated with influenza A(H3N2) and subclinical VZV infections

after exposure to salicylate (10). A meta-analysis by Dao T L et al revealed that the proportion of co-infection of influenza viruses in patients infected with SARS-CoV-2, in children was 3.2% and that among adult patients was 0.3%(11).

Misdiagnosis of co-infections can lead to increased mortality and morbidity. Therefore, prompt recognition and appropriate management of coinfections should be undertaken.

CONCLUSION

Clinicians should have knowledge of the epidemiological data, classical clinical features, natural course and complications of the commonly occurring infectious diseases like varicella and H1N1 in tropical countries. Whenever clinical features are overlapping, concurrent co-infections should be strongly suspected. Prompt diagnosis, timely identification and treatment of coinfections result in favorable outcomes.

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