Review Article

A REVIEW ON TOMATO FLU OR HAND, FOOT AND MOUTH DISEASE (HFMD)

ABSTRACT

"Tomato Flu" refers to a relatively new viral condition that garnered attention in 2022, especially in various region of India. It's important to note that despite its name, Tomato Flu is not a type of influenza. The term "flu" in this context might be slightly misleading as it is not related to the influenza viruses that cause seasonal flu. The name "Tomato Flu" arises from one of its characteristic symptoms: the formation of red, tomato-like blisters on the body of infected individuals. This virus primarily affects young children, particularly those between the ages of one and five. However, there are also reports of older children and adults, especially the elderly with weakened immune systems, being affected. The exact transmission mode of Tomato Flu was still under investigation, it was believed to spread through close contact, which is common for many viral infections in children. Still there is no develop any specific antiviral drug for Tomato Flu. Management of the condition primarily focused on alleviating symptoms, such as using acetaminophen or ibuprofen to reduce fever and pain. Supportive care may be given.

KEY WORDS- Blisters, flu, tomato flu, Hand Foot and Mouth Disease, Enterovirus, body aches, children

INTRODUCTION

This disease is called "tomato flu" because patients develop red, painful blisters that gradually expand to the size of tomatoes. "Tomato flu" is caused by coxsackievirus A16.This virus belongs to the enterovirus family.[1,4]

Enteroviruses are an ancient and important group of RNA virus. Humans are the sole reservoir of enteroviruses (NPEV). Tomato is also known as hand, foot and mouth disease (HFMD).[2,8,9]

Dr. Rajeev Jayadevan, member of IMA Kochi, said, "The disease, usually caused by coxsackie disease, causes small red bumps on the skin where it is bitten for 4 to 6 months. It then turns into blisters with fluid inside.

It first appeared in India on May 6 in Kollam district of Kerala A case of tomato flu was detected in 2022, and more than 82 cases of tomato flu in children under 5 years of age were reported in hospitals by the local government as of July 26, 2022. The flu also affected Anchal, Aryankavu and Neduvathur districts of Kerala. [1,3,7,8,11,12,14]

UNDER PEER REVIEW

Fig .1 HAND, FOOT AND MOUTH DISEASE

VIROLOGY

Coxsackievirus A16 (CV-A16) is one of the major etiologic causes of HFMD. It is a member of Human enterovirus A (HEVA) species of the Enterovirus genus of the Picornaviridae family. CV-A16 is a single-stranded, positive sense, polyadenylated RNA virus of approximately 7400 bases with an icosahedral symmetry structure. The genome, as like other enteroviruses, consists of three types of regions; non-coding regions, a structural region and a non-structural region. The reading frame (structural and non-structural regions) encodes a large polyprotein precursor, which is subsequently processed into structural protein P1 and non-structural proteins P2 and P3. P1 can be processed by a virus-encoded proteinase, which results in viral capsid subunit proteins VP0, VP1 and VP3, VP0 can be further cleaved to yield VP2 and VP4. VP1, VP2 and VP3 lie on the outer part of the capsid while VP4 is situated on the inner part. The neutralization epitopes mainly reside on VP1. The non-structural regions P2 and P3 includes 2A, 2B, 2C, 3A, 3B, 3C and 3D which are replication proteins. The coding region that encodes large polyprotein precursor is flanked by 50 and 30 untranslated regions (50 UTR and 30 UTR). The 50 UTR contains approximately 740 nucleotides; they consist of sequences that control genome replication and translation. The 30 UTR contains a polyadenine tail which is essential for virus infectivity. CV-A16 is a non-enveloped, icosahedral particle where the external portion of the icosahedral capsid comprises 60 copies of VP1, 2 and 3 while their N-terminal extensions and VP4 line the interior. [1,4,9,10,14]

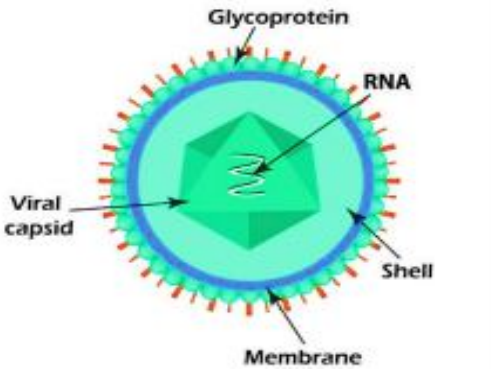

Fig .2 Coxsackievirus A16 (CV-A16)

CLINICAL MANIFESTATIONS

UNDER PEER REVIEW

This illness was primarily reported among children in India. The term "tomato flu" arose from the characteristic red, tomato-like blisters that were part of its clinical presentation. A summary of the known clinical manifestations of this condition[2,6,8,10,15,17]

- Skin Lesions: One of the most notable features of this illness was the appearance of red, painful blisters on the skin. These blisters were described as looking like tomatoes, which is what led to the nickname "tomato flu."
- Fever: As with many viral infections, fever was a common symptom. This is the body's natural response to fighting off a viral infection.
- Fatigue and Malaise: General feelings of tiredness and discomfort were reported, which are typical in many viral illnesses.
- Aches and Pains: Body aches and joint pains might also have been part of the symptom complex.
- Gastrointestinal Symptoms: Some cases may have included gastrointestinal symptoms like nausea, vomiting, or diarrhea.
- Respiratory Symptoms: Although less emphasized in reports, some respiratory symptoms such as coughing or a runny nose could be present, akin to other viral infections.
- Similar to other infectious diseases: The symptoms of "tomato" are similar to other infectious diseases, especially hand, foot and mouth disease (HFMD), which occurs in children and is caused by enterovirus.

DIAGNOSTIC TEST

Hand Foot and Mouth Disease (HFMD) is one of the many infections that result in mouth sores.However, health care providers can usually tell the difference between HFMD and other causes ofmouth sores by considering the patient's age, the symptoms reported by the patient or parent, andthe appearance of the rash and/or sores. Diagnosis is largely clinical. [2,6,9,12,14,17,18-20]

1. **Clinical Examination**: The diagnosis would primarily start with a thorough clinical examination. Doctors would look for the characteristic red blisters and other symptoms like fever, body aches, and signs of a viral infection.
2. **Patient History**: Understanding the patient's medical history, recent activities, and any potential exposure to known viruses or sick individuals would be crucial.
3. **Sample collection**:
   Samples from throat or stool may be sent to a laboratory to test for isolating the virus involved in causing the illness, which may take 2–4 weeks to obtain the laboratory results. The testing should be done for investigation of an outbreak, so that preventive measures can be initiated.
   1. Respiratory Samples: Throat and / or Nasopharyngeal Samples can be collected within 48 hours of illness
   2. Fecal Samples: The sample should be collected within 48 hours of illness
   3. CSF: It can also be collected within 48 hours if patient has encephalitis
   4. Biopsy of Lesions
   5. Skin Scraping of lesions in Viral Transport Media: Rash with vesicles (From Palm of Hands/ Soles of Feet)

4. **Laboratory Investigations**:
   1. Real Time PCR

UNDER PEER REVIEW

2. Viral isolation on monolayer of Vero Rhabdomyosarcoma and MRC 5: If cytopathiceffect is seen, Immunofluorescence test with Enterovirus screening set (Enterovirus, CBV, Echo, Poliovirus blends) may be done for confirmation
3. For Serology: 4-fold rise in level of neutralizing antibody in paired blood samplecollected at an interval of 14 days (One Acute sample at the onset of illness and secondsample after ten days of illness)

5. **Differential Diagnosis**: It's crucial to differentiate "tomato flu" from other conditions with similar symptoms, such as chickenpox, measles, or hand, foot, and mouth disease. This involves comparing the patient's symptoms, history, and test results with those typical of these other diseases.

MANAGEMENT-

"Tomato flu" appeared to be a viral infection, its management would be largely symptomatic and supportive, similar to the approach taken for other viral infections in children.
As reported, Tomato Flu or Tomato fever is a self-limiting disease which means that it tends to go on its own, without any medications. Hence, there are no specific drugs available in the market to treat or cure the condition. Here are the general principles that would likely guide the treatment [3,4,6,9,10,13,14]

1. **Symptomatic Relief**:
    - Fever and Pain Management: Paracetamol (acetaminophen) or ibuprofen use to manage fever and pain, but it's essential to use these in age-appropriate doses.
    - Topical Treatments: For skin lesions or blisters, soothing lotions or creams might be recommended to reduce discomfort.
2. **Hydration**:
    - Maintaining hydration is crucial, especially if the child has a fever or is reluctant to eat or drink. Oral rehydration solutions might be used in cases of dehydration.
3. **Rest**:
    - Adequate rest is important for recovery. Children with this condition should be encouraged to rest as much as needed.
4. **Isolation and Infection Control**:
    - To prevent the spread of the infection to others, particularly in schools and households with multiple children, isolation of the affected child might be recommended until they are no longer contagious.
5. **Monitoring**:
    - Parents and caregivers advise to monitor the child's symptoms and overall health closely. Any signs of worsening condition or complications would warrant immediate medical attention.
6. **Avoidance of Certain Medications**:
    - As with many viral infections, particularly those involving rashes, aspirin avoid in children due to the risk of Reye's syndrome.
7. **Nutritious Diet**:
    - A balanced diet that is easy on the stomach recommend to support the child's immune system.
8. **Prevention of Secondary Infections**:
    - Careful hygiene and care of the skin lesions be necessary to prevent secondary bacterial infections.

UNDER PEER REVIEW

PROPHYLAXIS & PREVENTIVE MEASURE-

Preventing the spread of the condition colloquially known as "tomato flu" involves general measures typically recommended for controlling viral infections, especially those that are contagious and affect children.Here are some general preventive measures that would likely be recommended. [6,9,14,17]

1. **Good Hygiene Practices**:
    - Regular and thorough hand washing with soap and water is crucial, especially after using the bathroom, before eating, and after any contact with someone who is sick.
    - Children should be taught to cover their mouths and noses with a tissue or their elbow when coughing or sneezing.
2. **Avoiding Contact with Infected Individuals**:
    - Keeping children who are sick away from school and other group activities can help prevent the spread of the virus.
    - Minimizing close contact with individuals showing symptoms of the illness.
3. **Clean and Disinfect Surfaces**:
    - Regular cleaning and disinfecting of frequently touched objects and surfaces, like toys, doorknobs, and mobile devices, can reduce the risk of virus transmission.
4. **Isolation of Affected Individuals**:
    - If a child is infected, keeping them isolated from others, especially other children, until they are no longer contagious is important.
5. **Education and Awareness**:
    - Educating families, schools, and communities about the symptoms, mode of transmission, and preventive measures can help control the spread of the virus.
6. **Healthy Lifestyle**:
    - Encouraging a healthy lifestyle, including a balanced diet and adequate sleep, can strengthen the immune system.
7. **Monitoring and Reporting**:
    - Parents and caregivers should monitor the health of their children closely and report any unusual symptoms to healthcare providers promptly.
8. **Avoid Sharing Personal Items**:
    - Children should be encouraged not to share personal items like utensils, cups, and towels.
9. **Public Health Guidance**:
    - Following any additional advice or guidelines issued by local health authorities or schools can be crucial in controlling outbreaks.

CONCLUSION

The recent Indian epidemic of ‘tomato flu’ with large red blisters in the hand, foot and buttocks was later identified to have been caused by a variant of CV-A16. The term ‘tomato flu’ is no longer used, and it is identified as yet another outbreak of HFMD. It first appeared in India on May 6 in Kollam district of Kerala A case of tomato flu was detected in 2022.Coxsackievirus A16 (CV-A16) is one of the major etiologic causes of HFMD. It is a member of Human enterovirus A (HEVA) species of the Enterovirus genus of the Picornaviridae family.Rashes form on the skin due to tomato fever, causing skin irritation. Other symptoms include weariness, nausea, vomiting, diarrhoea, fever, dehydration, joint swelling, body pains, and frequent influenza-like symptoms, similar to dengue.

UNDER PEER REVIEW

The treatment for tomato flu is to stay hydrated, take lots of rest and sleep. It is important not to let the blisters burst. It is advised people wait for the symptoms to subside on their own, which can take about ten days to resolve.Doctor may advise symptomatic treatment for fever, body aches, rashes etc. It is essential to isolate so others do not fall sick.Tomato flu is not dangerous enough to be termed as a life-threatening disease. In most cases, the person recovers in a few days with proper rest and care.Prevention is the best cure in the case of tomato flu. Because more study is required to understand the reasons and develop a therapy, the best method to protect our children from tomato fever is to take preventative precautions.Tomato flu is very infectious yet not fatal. In most situations, it is treatable at home with a few drugs. However, before giving your child any medication, you should contact a doctor. If your kid is experiencing severe symptoms such as diarrhoea, vomiting, or dehydration, he or she may require hospitalization.

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UNDER PEER REVIEW

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UNDER PEER REVIEW

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