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The Mystery of Tomato Flu in India

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Abstract

Introduction: *While the globe fights against monkeypox and the coronavirus, a new virus known as "Tomato flu" threatens. This virus's recognized target is children. In May 2022, the virus was found for the first time in Kerala, India. Due to its principal symptom, tomato-shaped blisters all over the body, the ailment was given the term "Tomato Flu." Recent reports described it as type of hand, foot and mouth disease (HFMD). It is easily diagnosed by a history and physical examination. It is an infectious condition, but there are still a lot of unanswered questions. To shed light on this topic, we decided to collect and summarize the information on this novel viral pathogen.* ***Materials and Methods:*** *To accomplish this, we undertook a thorough literature assessment of the Tomato Flu research that has already been done. We analyzed data from various sources such as medical journals, government reports and news articles to gain a better understanding of this emerging disease. In addition, we conducted interviews with healthcare professionals who have treated patients with Tomato Flu to gain insights into their experiences.* ***Results:*** *Survey of literature showed that Tomato Flu is a self-limiting disease. Children under the age of 5 and immunocompromised individuals are more susceptible to this disease. There is no diagnostic test for the disease, differential diagnosis involves typical symptoms and the absence of other known viral agents. There is no treatment, supportive care brings relief.* ***Conclusion:*** *Overall, this review provides a better understanding of Tomato Flu and its potential impact on public health. By shedding light on this emerging virus, we hope to contribute to ongoing efforts to prevent and treat of this infectious disease.*

Keywords: *Tomato flu, HFMD, infectious disease.*

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Introduction:

While the world continues to fight against monkeypox and Coronavirus, a new virus known as "Tomato flu" looms large. Children are reported especially susceptible to contract this virus. Twenty-six children under the age of ten have the "Tomato Flu," so far, while 82 toddlers under the age of five have had it [1,2]. The virus was discovered for the first time in Kerala, India, in May 2022. The condition was nicknamed "Tomato Flu" since its primary symptom is tomato-shaped blisters throughout the body[3]. The illness initially manifests as a reddish tiny blister that grows to mimic the shape of a tomato, thus the names "Tomato flu" and "Tomato fever [4]". Although adults may function as carriers and spread the virus when handling children, the illness primarily impacts youngsters. According to Dr. Amar S Fettle, an epidemiologist and the state nodal officer for Kerala, tomato flu is categorized as "Hand, Foot, and Mouth disease" (HFMD), a common viral illness[5]. Viruses from the enterovirus genus, including polioviruses, coxsackie viruses, echoviruses, and other enteroviruses, are responsible for HFMD. The most common cause of HFMD is coxsackie virus A16. Only a moderate version of the illness is caused by coxsackie virus A16 infection in HFMD[6, 7]. Through contact with an infected individual, tomato flu can be transmitted from one person to another. Similar to cold, it spreads from person to person by touching the patient's secretions, including feces such as while changing a baby's diaper at a daycare center[8]. Aside from fatigue, vomiting, diarrhea, fever, dehydration, joint swelling, body pains, and rashes on the hands and feet that gradually get worse, tomato flu can also cause joint swelling and body pains[9]. None of the children who had tomato flu were hospitalized, and it was noted that they all recovered spontaneously[10]. The main signs and symptoms of tomato flu in children are high fever, rashes, and excruciating joint pain, which are also characteristics of chikungunya. For the diagnosis of Tomato Flu, molecular and serological test for dengue, chikungunya, zika, varicella-zoster, and herpes in children with these symptoms, is performed[11]. Once these viral illnesses are ruled out, tomato virus infection is established. There are similarities

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between the treatment for tomato flu and that for chikungunya, dengue, and hand, foot, and mouth disease, including the use of a hot water sponge to alleviate itching and rashes. It is necessary to use paracetamol as supportive therapy for fever, body aches, and other symptoms.

Materials and Methods:

The terms "tomato flu," "hand foot and mouth disease," "rashes," "coxsackie virus A16," and "HFMD" were used in a comprehensive search of the electronic databases of PubMed, Embase, LitCovid, MedRxiv, BioRxiv, Google Scholar, EBSCO MEDLINE, CINAHL, and Scopus to find studies published between January 2021 and December 2022. When applying statistical analysis to pool incidence in children under the age of five associated with tomato flu or hand, foot, and mouth disease, the random effect model proved to be extremely helpful.

Epidemiology:

In Kerala, cases of tomato fever have traditionally been noted since 2007[12]. During the period, there were several cases of infection in the Kottayam and Pathinamtita district areas of Mudakayam, Varzur, and Kanirapally, which were also affected by the Chikungunya virus[13]. Of the surveyed households, 52.8% of the residents had Chikungunya clinically, with 73.4% of the affected being in the adult age group. The most common symptoms were swelling of the joints (69.9%), followed by headache (64.1%) and itching (50.3%), with the knee joint being the most commonly affected (52%)[14]. The unusual viral infection was widespread and was not considered to be life-threatening. According to estimates, 82 young children under the age of five have apparently been impacted thus far. There is no specific treatment to treat tomato flu because it is a self-limiting illness. Twenty six children in the state of Odisha, ranging in age from 1 to 9 years, were found to have the ailment, according to the Regional Medical Research Centre in Bhubaneswar[14]. Bathinda had also reported four to six cases, and due to the similarity of the symptoms, physicians suspected tomato flu[15]. As a preventative move, Anganwadi institutions (Odisha state Government's Department of Women & Child Development & Mission Shakti) have been closed, and officials have begun small-scale awareness campaigns to disseminate the news[16].

Clinical Features:

Although the symptoms of the tomato flu virus resemble those of COVID-19 (both are initially characterized by fever, exhaustion, and body-aches, and some COVID-19 patients also report skin rashes), the virus is unrelated to SARS-CoV-2. It is speculated that tomato flu may not actually be a viral illness in children, but rather a complication of dengue or chikungunya fever[17]. It is also speculated that the virus may possibly represent a novel strain of the viral hand, foot, and mouth disease, a prevalent infectious illness that mostly affects children and people with impaired immune systems. In certain case studies, immune-competent individuals have also been seen to have the condition1[16,18]. Although, the main signs and symptoms of tomato flu in children are high fever, rashes, and excruciating joint pain, which are also characteristics of chikungunya[18,19], the blisters, which appear all over the body mimic those that young people who have the monkeypox virus experience[20,21]. In addition to rashes which irritates the skin, additional signs and symptoms, similar to dengue and other viral illnesses, includes tiredness, nausea, vomiting, diarrhoea, fever, dehydration, swelling of the joints, and body pains[22,23] (Figure-1). When these viral diseases are ruled out in children with similar symptoms, the presence of tomato virus issuspected[16,23,24]. Although the symptoms of tomato flu and chikungunya or dengue are similar, there is no evidence to support this association at present[25]. There are no significant illnesses brought on by tomato flu. Complications from the illness are uncommon[4].

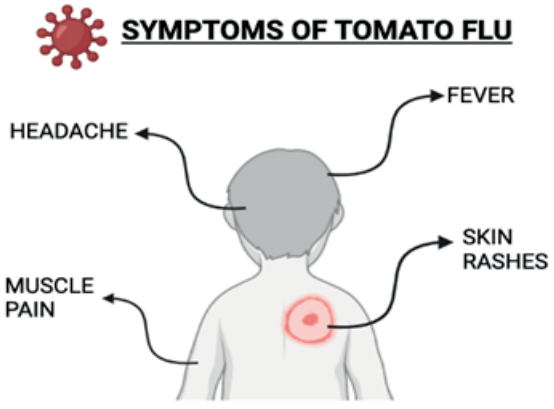

Figure 1: Symptoms of Tomato Flu

Latest UK Tomato Flu case

One week after returning from a one-month family vacation to Kerala in May 2022, a 13-month-old child and her elder 5-year-old brother both got rashes on their hands and legs. The local media in Kerala was covering a strange sickness among youngsters known as "tomato fever" during the time of their visit. The boy played with kids who had recently recovered from the "tomato flu," and did not have any interaction with ill kids. Both kids got vesicular rashes a week after they got back to the UK, although that in the girl's was more noticeable. Fever and any other systemic signs were absent in both children. The boy's lesions had already begun to heal when, two days later, the daughter experienced a severe oral lesion that caused considerable salivating. Both kids went to the pediatric emergency room, where virus swabs were tested using PCR. A test for enterovirus (EV) was performed on both kids. A national reference laboratory also examined the girl's samples for monkeypox because of the rash's fleshy vesicular look (Porton Down, Salisbury, UK). While the monkeypox PCR was negative for the female, the EV PCR was positive for both kids. Another national reference lab (UKHSA-Colindale, London, UK), which had Coxsackie A16, carried out EV typing by sequencing. By Day

6 in the boy's case and Day 16 in the infant's case, the lesions had almost completely healed and left no visible scars[25].

Tomato Flu and Covid-19:

It is reported that the tomato flu virus in Covid-19 exhibits similar symptoms. For instance, both viruses can cause symptoms including fever, coughing, and shortness of breath, which are early warning signs. Rashes on the skin have been mentioned by a few Covid-19 patients[26]. The virus that causes tomato fever, however, is not related to SARS-CoV-2. It's possible that dengue or chikungunya fever complications exist in the children and tomato flu aren't truly viral infections at all[17, 20].

Tomato Flu with Relation with Monkeypox:

The main symptoms include a high fever, body pains, joint swelling, exhaustion, rashes, and blisters. Fever, bodily pains, weariness, and perhaps enlarging lymph nodes are some of the early indications of monkeypox. In tomato flu patients, hands, feet, face, mouth, or even genitalia, the virus may cause rash that leaves behind red lumps on the skin[21, 22]. The negative consequences of monkeypox on people are similar to those of chickenpox and smallpox since it is caused by the same virus. By having intimate contact with an infected person or animal, such as a rat, a monkey, or a squirrel, one can catch the infectious disease, monkeypox. However, there is no information available regarding the virus that causes tomato flu. Despite the lack of a diagnostic test, we can suspect tomato flu based on the symptoms and the absence of any other viral diseases[28, 37].

Prevention:

When an unknown virus suddenly breaks out, prevention is essential. An outbreak's effects can be readily managed if everyone properly adheres to preventative measures. Compliance with preventive measures is dubious, nevertheless, as Tomato flu frequently strikes children under the age of five. Their guardians must use caution when there are illness outbreaks[26]. The tomato flu spreads by direct touch. Due to a lack of hygiene maintenance and a propensity for putting their hands in their mouths, it can cause widespread among school-age youngsters. Children can become carriers because the infectious agents can stay in their bodies for several weeks after the sickness has subsided. Without displaying any symptoms of the illness, adults can also spread the virus when they come into contact with youngsters[27]. In the case of an unexpected illness epidemic, prevention is always the best approach to control it[27]. To stop the virus from spreading to other children or adults, isolation should be used for 5-7 days after the beginning of symptoms. The most effective method of prevention is maintaining good hygiene, sanitizing the immediate area, and keeping the sick kid from sharing toys, clothes, food, or other objects with other children who are not ill. The most effective and economical methods for protecting the population from viral infections, particularly in children, the elderly ,immunocompromised individuals, and those with underlying medical conditions, are drug maintaining personal hygiene, drug repurposing and immunization[28] (Figure-2). Encourage children to exercise excellent hygiene by educating them to routinely wash their hands and cover their mouths and noses when they cough or sneeze. Separating and regularly sanitize items such as clothes, bedding, and utensils is also an effective measure to control infection. Other effective measures include avoiding infected people, eating healthily to maintain and improve immunity, and the most important of all, getting enough exercise, sleep and relaxing time[29].

Figure-2: various preventive and safety measures

Treatment:

There are now no particular medications available to treat the tomato flu virus because it is an uncommon viral illness that has recently emerged[30]. The blisters due to flu should not be scratched, according to health professionals. Additionally, people with this illness need to stay hydrated and practice good sanitation and hygiene. One must also avoid direct contact with those who are ill in order to prevent the transmission of this disease[31]. It is a self-limiting infectious disease; the signs and symptoms of tomato flu disappear within a few days. Due to the disease's rarity, no treatments are available that target it specifically. The doctors treat the child's symptoms in accordance with his or her needs. To reduce symptoms, physicians prescribe antipyretics and painkillers[24]. Seclusion, relaxation, lots of drinks, and a hot water sponge are recommended to soothe itching and rashes. To better comprehend the need for prospective remedies, further study and inquiry is required[32, 33].

Tomato Flu Identification:

Typical symptoms and absence of know viral agents (using molecular and serological test), such as dengue, chikungunya, Zika virus, varicella-zoster virus, and herpes, presenting similar symptoms are considered as indicate of tomato flu viral infection. Once the diagnosis has been determined, symptomatic therapy must be given because there is no cure for tomato flu. The Lancet Journal warns that failure to contain and stop the spread of the pediatric tomato flu pandemic to adults might have disastrous consequences[1,34,35].

Recent Discussion:

Recently, exceptionally large tomato-like rashes that are not typical of HFMD, especially in children have drawn the attention of scientists. The disease received this interesting because the rash, which is characteristics of this disease resembles tomato. Because of the similarity of the symptoms associated with tomato flu resembles those of other viral diseases, there is an unurgent need to characterize the virus and develop appropriate diagnostic tests[36,37]. However, it is important to note that since early May 2022, there have only been a few hundred confirmed cases of tomato flu, indicating that the outbreak is probably under control[35,38].

Conclusion:

At the period of rising anxiety about the nationwide monkey pox outbreak, instances of tomato flu were discovered. The term tomato flu came in the picture cause of the blisters present on hands, buttock and foot resembles tomato. Few studies suggested that it as a variant as HFMD. Overall, prompt preventative steps are crucial for controlling the sickness and preventing new outbreaks. These involve practicing proper sanitation and hygiene as well as requiring five to seven days of seclusion following an infection. The best approach would be to continue to preventive measures as there is no effective treatment for this novel disease.

Conflict of Interest: None.

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