



## Case report

# A case report of severe systemic infection with neurological HFMD symptoms followed by an accidental puncture of thumb during HFMD sample collection



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## ABSTRACT

A 34-year-old female clinical virology assistant was punctured with a contaminated lancet used for sampling from a suspected Hand, Foot, and Mouth disease (HFMD) patient. Five days after a puncture, the disease symptoms manifested, including high fever, ague, and stiff neck. Skin rashes suddenly appeared after day 6. Stiff neck and fever were relieved two days after the rash appeared, and rashes disappeared gradually by the next five days. Samples for molecular detection and virus cultivation were taken from the patient. Real-time PCR found the enteroviral RNA in the throat swab and skin rashes. The specific CPE of Enteroviruses appeared on the Vero cell line after three days of incubation. In this case transmission occurs through needle injury and results in the systemic disease, so unusual and unexpected viral transmission should be considered when dealing with samples.

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## Introduction

Hand, foot, and mouth disease (HFMD) is a common human childhood infection. The disease is caused by many members of the *Enterovirus* genus in the family of *Picornaviridae* [1]. These are small, non-enveloped viruses consisting of a single-stranded, positive-sense RNA [2]. *Coxsackievirus* type A 16 (CA) and *Enterovirus* 71 (EV71) usually are the most common cause. Due to its complications, HFMD remains a significant public health concern. Whereas the disease is highly transmissible and there is no effective vaccination against that, special hygienic measures are essential to prevent disease transmission [2]. HFMD virus is contagious and is usually transmitted with droplets spread in the air and close contacts [3]. In children, the disease presents itself by an acute febrile infection accompanied by vesicular exanthema by hand, feet, and oral mucosa [4]. Nail matrix involvement is another issue frequently reported after systemic illnesses. Infected persons are most contagious during the first week of the illness via their respiratory droplets, and

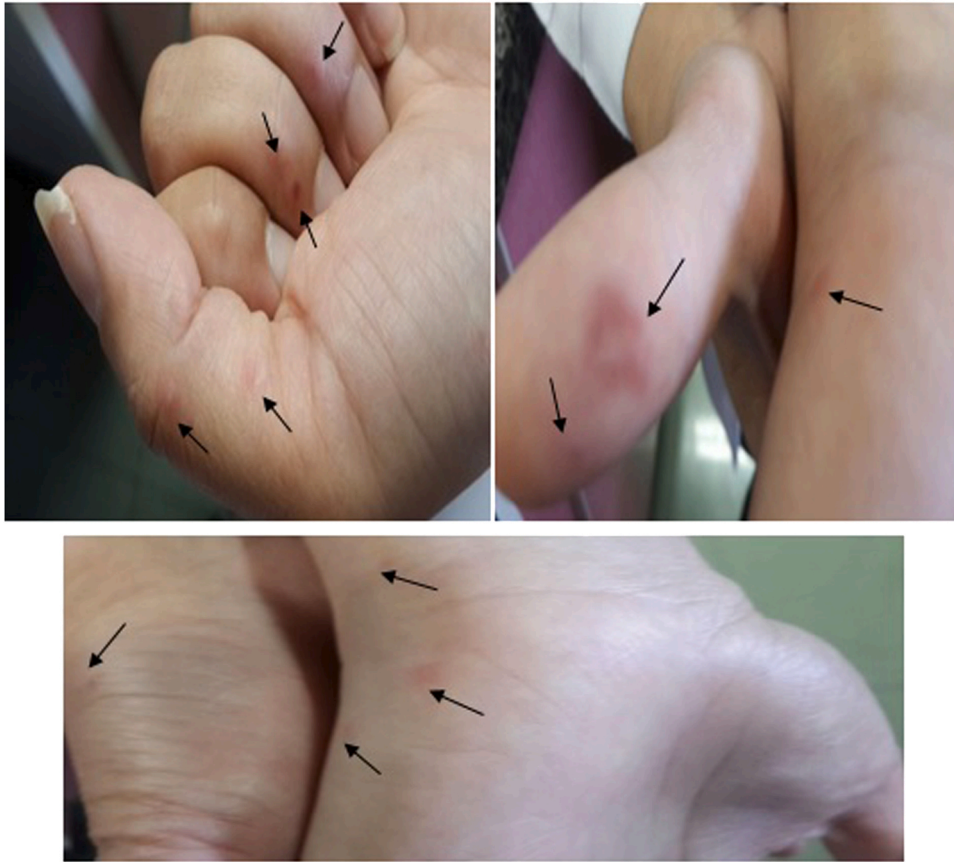
prolonged gastrointestinal shedding of the virus may prolong the period of communicability by several weeks [5]. Nosocomial HFMD infections were primarily reported in children's wards, but reporting of accidental infection due to unusual routes are scarce. Actually, needling in the laboratory that results in a severe systemic HFMD infection is unusual; this report has been shown it could be a way of transmission and should be considered.

## Case reports

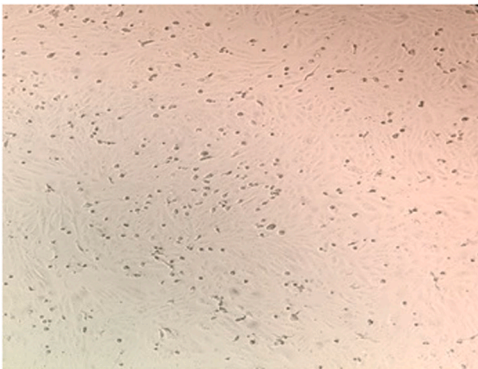
A 7-year-old boy with high fever, ague, non-exudative pharyngitis, enanthema of the mucosal, soft pallet in the oral cavity, and hand skin rashes was referred to a physician. The physician requested virus cultivation and PCR. During sampling, the lab assistant accidentally needled herself with a contaminant lancet on her thumb. Anyway, samples have been taken from the boy lesions and confirmed as EV. After Five days, the lab assistant developed disease signs such as high fever, ague, sore throat, burning, and pain when swallowing. The next day, skin lesions appeared on the hand, foot, and under the nails (Fig. 1). The lesions were itchy and moderate discomfort occurred in the oral cavity. The assistant had no allergies, nutritional intolerance, medical issues, or history of drug intake. Two samples were obtained from her hand and oral mucosal tissues lesions and subjected to enteroviral Real-time PCR using Path-

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**Fig. 1.** Skin lesions on hands.



**Fig. 2.** Virus CPE on Vero cell line.

Enterovirus-EASY kit and ABI Step OnePlus Real-time PCR System (according to the Path-Enterovirus-EASY kit, GENESIG protocol). In addition, viral culture on Vero and A549 cell lines was performed as per the standard viral isolation protocols. The real-time PCR test was positive for both samples, and pathognomonic enteroviral CPE was seen on the Vero cell line (Fig. 2).

### Discussion

Hand, foot, and mouth disease stems from oral mucosal vesicles and ulcers, usually appearing simultaneously. The disease involving the cutaneous vesicles is typically located on the hands and feet. Oral lesions may occur without cutaneous rashes. In the case we reported, oral lesions were absent [6–8]; this is consistent with a previous report on purely cutaneous HFMD, which was seen in an immunocompromised 27-year-old man [6]. In 2017, Win Kyaw Phyu

et al. reported that transmission of EV-A71 from person to person mainly was through fecal-oral and oral-oral ways, indicating that viruses are detectable in oral secretions and feces. They have been supposed that the main entry of the virus to the host body is via the Oro-digestive tract. However, it has been established that the virus uses the palatine tonsil as an entry portal. The localization of viral antigens and RNA within the tonsillar crypt squamous epithelium was confirmed, and these cells were the infection target. Our findings support the involvement of EV squamous epitheliotropism because it has a propensity to squamous cells in the palatine tonsil [9]. In the present case, the transmission did not occur through the usual droplet borne or other reported caching routes. Instead, the infection happened via being needled, which don't suppose to mimic the singe and symptoms of naturally infected persons.

### Conclusion

Given the present case findings, the transmission of HFMD infection through lesions should be considered when sampling or working on the viruses.

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### Conflict of interest

The authors of this manuscript declare no conflict of interest.

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## Ethical approval statement

This case study was approved by the Professor Alborzi Clinical Microbiology Research Center located in Namazi Hospital, Shiraz, Iran.

## Consent

The first author and case report of this article is Maryam Zare, who has filled in and signed the consent statement on behalf of all the authors.

## Authors' contributions

Maryam Zare (case report) & Marzieh Jamalidoust & Mazyar Ziyaeyan wrote and prepared the article. Mandana Namayandeh performed sampling and testing for confirmation. Maryam Shafaati edited and submitted the article. Gholam R. Pouladfar, Ali Amanati and Mazyar Ziyaeyan read and approved the final manuscript.

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