

HAND, FOOT AND MOUTH DISEASE

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Introduction

Hand, foot, and mouth disease (HFMD) is a common viral infection which encompasses a clinical syndrome of fever, skin rash and mouth sores. It is caused by several serotypes of enterovirus, such as coxsackievirus A and B, echoviruses, and other enteroviruses. Coxsackievirus A16 and enterovirus A71 are the primary serotypes linked to HFMD and account for most major outbreaks. HFMD mainly occurs in infants and children < 10 years of age but can occur in any age group. Summer and early autumn are peak seasons for HFMD, though it may occur any time of year.

Transmission

HFMD is highly contagious and can spread rapidly in daycare centres and schools. Infection can occur if this virus comes into direct contact with any mucosal surface (eyes, mouth, nose). Infectious virus will be present in the vesicular fluid of the skin rash and mouth sores. Individuals with current or recent HFMD will also shed the virus in their stool and oral/respiratory secretions (droplets from coughing, sneezing). The main form of transmission is person-to-person via the faecal-oral route. Surfaces and objects such as door handles, eating utensils, toys and stationery can be contaminated with oral/respiratory droplets or faeces, and can thus also transmit the virus.

Clinical manifestations

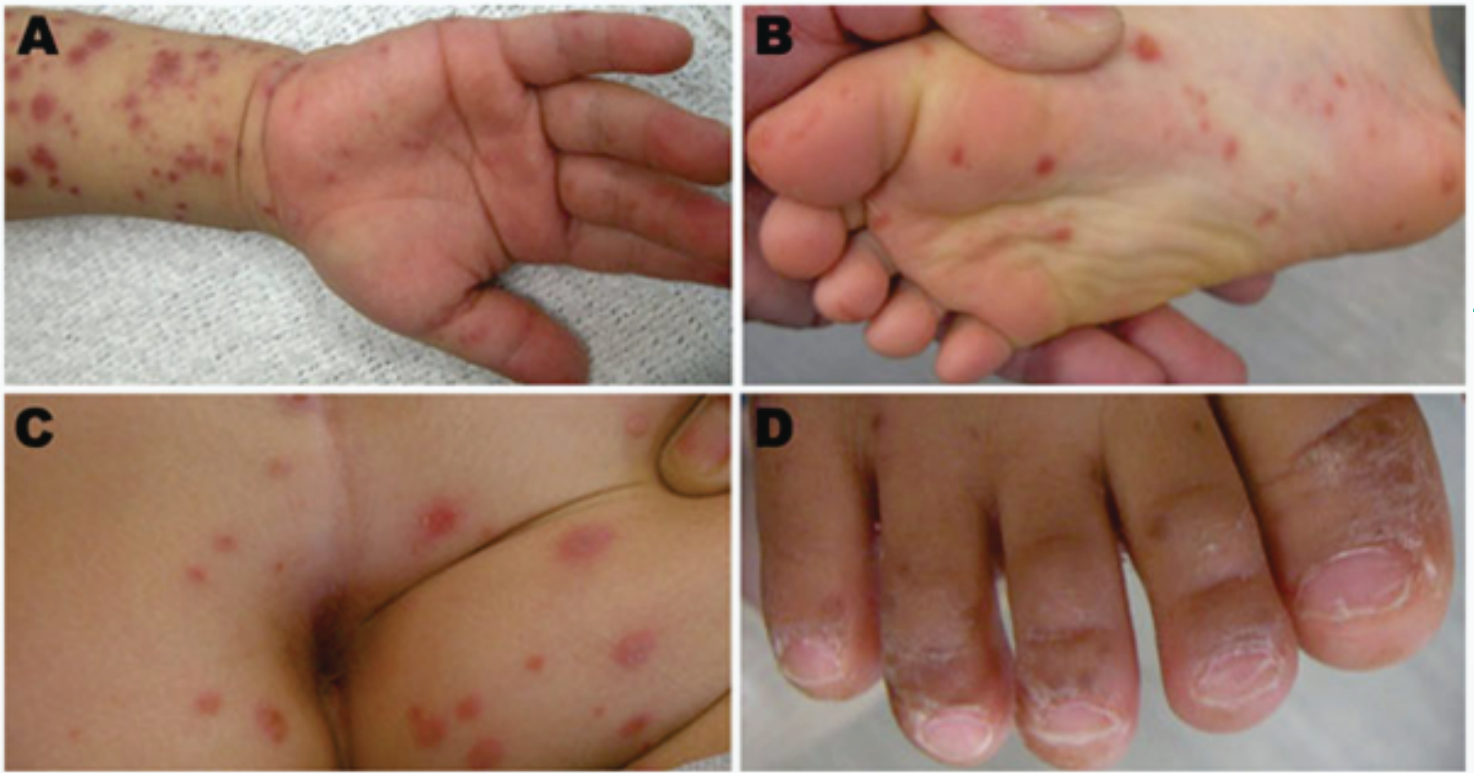
The incubation period range for HFMD is 2 – 7 days (3 – 5 days on average). Though 75% of symptomatic patients will have both oral lesions and the skin rash, it is important to note that oral lesions may also occur without the skin rash, and vice versa.

Asymptomatic enteroviral infections may also occur, and such individuals can still be infectious and shed virus in their stool and oral/respiratory secretions.

Signs and symptoms typically include low-grade fever, sore throat, small vesicles/superficial ulcers inside the mouth, and macular/maculopapular/vesicular rash on the hands and feet. Atypical presentations with the rash occurring outside these mentioned areas may also occur, e.g. buttocks, arms, and thighs. In neonates and immunosuppressed patients, the rash may be disseminated all over the body. Skin lesions are not typically pruritic or painful. However, mouth lesions can be painful which can lead to refusal of feeds and excessive drooling.



Figure 1: Typical HFMD oral lesions



Reproduced from: Fujimoto T, Iizuka S, Enomoto M, et al. Hand, foot, and mouth disease caused by coxsackievirus A6, Japan, 2011. *Emerg Infect Dis* 2012; 18:337.

Figure 2: Typical HFMD skin rash A) Hand and arm of a 2.5-year-old boy; B) foot and C) buttocks of 6-year-old boy; D) nail matrix of a 20-month-old boy.

Prognosis & complications

HFMD is a self-limiting illness. The majority of infected individuals will improve clinically after 7 – 10 days without any intervention. Complications are rare, but include dehydration secondary to poor feeding from mouth sores, neurological (encephalitis, aseptic meningitis, acute flaccid paralysis), myocarditis, pancreatitis, foetal loss, conjunctival ulceration and onychomadesis (shedding of the nail).

Differential diagnosis

Other conditions which cause maculopapular or vesicular rashes include:

Rubella	Mpox	Chickenpox
Measles	Insect bites	Contact dermatitis

Diagnosis

The diagnosis of HFMD is primarily clinical, based on the characteristic rash and its location. If the diagnosis is uncertain, symptoms are atypical or severe, or complications arise, a polymerase chain reaction (PCR) test for enterovirus can confirm the diagnosis.

Samples for PCR testing include a dry swab of vesicular fluid from skin or mouth lesions. If neurological complications are present, cerebrospinal fluid (CSF) can be tested

using the CNS viral PCR panel, which includes enterovirus. Stool, and rectal and throat swabs may also be tested, but detecting enterovirus in these samples does not confirm causality. This is because the virus can be shed in stool and respiratory/oral secretions during both symptomatic and asymptomatic enteroviral infection, as well as for weeks to months following acute infection (up to several months in stool and up to a month in respiratory/oral secretions).

The enterovirus PCR and CNS virus PCR panel are run daily at Lancet Laboratories, and the turnaround time is 24 hours from the time that the sample reaches the molecular laboratory.

Lancet Laboratories offers IgG and IgM serology testing for coxsackie B1-6, A7, A9, A16 and A24. Coxsackievirus A or B only, or IgG or IgM only can be requested but not individual coxsackie viruses.

For patients with acute HFMD in which confirmation testing is required, serology testing is **not recommended** as this only covers a specific and incomplete group of enteroviruses, and will miss HFMD caused by other enterovirus serotypes such as echoviruses, enterovirus A71 and other coxsackieviruses.

Management

There is no specific antiviral available for the treatment of HFMD. Most patients are successfully managed as outpatients with rest and supportive care. Pain and fever can be managed with simple analgesics and antipyretics such as acetaminophen or ibuprofen. Patients should be encouraged to keep the rash clean and avoid touching it. Since painful mouth sores can impede feeding and hydration, especially in infants and young children, such patients should be assessed for dehydration and admitted for IV fluids if indicated. Individuals with complications may also require hospitalisation.

Prevention

Avoidance of direct contact with ill patients and strict hygienic practices are the cornerstone of prevention. There is currently no vaccine to prevent HFMD.

- **Hand hygiene:** Enteroviruses that cause HFMD are non-enveloped viruses, which makes them more resistant to disinfectants when compared to enveloped viruses such as coronaviruses and influenza viruses. Enteroviruses are resistant to 70% alcohol-based hand sanitisers. Therefore, proper hand washing with soap and water is recommended as this physically removes the virus from the hands. In the childcare setting, strict hand hygiene practices should be instilled especially after changing diapers, as enterovirus is shed in stool for weeks to months after acute infection.
- **Surfaces:** Bleach or hydrogen peroxide solutions are effective against enteroviruses and should be used to disinfect high-touch surfaces and objects such as toys, door handles and shared stationery.
- Eating utensils and toothbrushes should not be shared.

For inpatients with HFMD, standard and contact precautions should be observed and during outbreaks, cohorting of infected patients can be done.

Excluding children with acute HFMD from school or creche should be avoided if they are well enough to attend, since this does not prevent transmission as individuals with asymptomatic or even resolved symptoms can still spread infection.

References

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