

Indian Academy of Pediatrics (IAP)



STANDARD TREATMENT GUIDELINES 2022



Hand, Foot and Mouth Disease

Lead Author

Narayanappa D

Co-Authors

Sailendra K Das, Bakulesh Chauhan

Under the Auspices of the IAP Action Plan 2022

Remesh Kumar R

IAP President 2022

Upendra Kinjawadekar

IAP President-Elect 2022

Piyush Gupta

IAP President 2021

Vineet Saxena

IAP HSG 2022–2023



© Indian Academy of Pediatrics

IAP Standard Treatment Guidelines Committee

Chairperson

Remesh Kumar R

IAP Coordinator

Vineet Saxena

National Coordinators

SS Kamath, Vinod H Ratageri

Member Secretaries

Krishna Mohan R, Vishnu Mohan PT

Members

Santanu Deb, Surender Singh Bisht, Prashant Kariya,
Narmada Ashok, Pawan Kalyan

Hand, Foot and Mouth Disease

60

Introduction

- ✓ Hand, foot, and mouth disease (HFMD) is a clinical syndrome characterized by an oral enanthem and a macular, maculopapular, or vesicular rash of the hands and feet caused by enteroviruses of Picornaviridae family.
- ✓ Most commonly caused by Coxsackievirus A16 and Enterovirus 71.
- ✓ Herpangina is a benign clinical syndrome characterized by fever and a painful papulo-vesiculo-ulcerative oral enanthem.

Etiology of hand, foot, and mouth disease and herpangina is presented in **Table 1**.

| <i>Hand, foot, and mouth disease</i> | <i>Herpangina</i> |
|---|--|
| Coxsackievirus A2, A4 to A10, A16, B2, B3, and B5 | Coxsackievirus A1 to A6, A7, A8, A9, A10, A16, A22, and B1 to B5 |
| Echovirus 1, 4, 7, and 19 | Echovirus 6, 9, 16, and 19 |
| Enterovirus A71 | Enterovirus A71 |

Etiology

Transmission

- ☑ Humans are the only carrier.
- ☑ The disease is spread by fecal-oral, oral-oral, and respiratory droplet contact.
- ☑ The patient is most infectious during the first week of illness; however, an active virus may be present in the stool for up to 4–8 weeks.
- ☑ Incubation is of 3–7 days.

Oral ingestion of virus that is shed from the gastrointestinal tract (GIT) or upper respiratory secretion of infected individuals or contact with vesicle fluid (oral or nasal secretions, saliva, blister fluid, and stool of infected persons).

Once ingested, enteroviruses replicate in the submucosal lymphoid tissues of the intestine, pharynx, and then to regional lymph nodes. Replication at these sites leads to a minor viremia → infection of reticuloendothelial tissues and multiple organs [central nervous system (CNS), heart, liver, and skin] → clinical manifestations.

Further replication at the disseminated sites → major viremia → type specific antibodies → death of infected cells with inflammation and necrosis.

Pathogenesis

Clinical Features

- ☑ HFMD is a clinical diagnosis based on the presentation of a low-grade fever, sore throat, malaise with a maculopapular or papulovesicular rash on the hands and soles of the feet, and by painful oral ulcerations (**Figs. 1A to C**).



Figs. 1A to C: Clinical features of hand, foot, and mouth disease.

- ☑ Skin lesions are 2–6 mm in diameter, have an erythematous halo, and evolve into vesicles that rupture and leave painless shallow ulcers that do not scar.
- ☑ Oral enanthems of painful ulcerations typically affect the posterior oral cavity, including the soft palate. Lesions may also affect the tongue and buccal mucosa, and pain may cause dehydration.
- ☑ Lesions resolve in 7–10 days.
- ☑ Patients may have atypical skin lesions, including hemorrhagic or purpuric lesions; bullae and pustules; trunk, cheek, or genital involvement; palm and sole of the feet desquamation; and accentuation in areas of atopic dermatitis (*eczema coxsackium*).
- ☑ Nail matrix arrest was reported in a small group of children after HFMD. *Beau lines* (transverse ridging) and/or *onychomadesis* (nail shedding) followed HFMD by 3–8 weeks.
- ☑ Coxsackievirus A6 is responsible for relatively severe, atypical HFMD (and herpangina) affecting adults and children that is characterized by fever, generalized rash (**Fig. 2**) (face, proximal extremities, and trunk, in addition to hands, feet, and buttocks), pain, dehydration, and desquamation of palms and soles.



Fig. 2: Generalized rash.

Herpangina

- ☑ Herpangina is characterized by sudden onset of fever, sore throat, dysphagia, and painful lesions in the posterior pharynx (**Fig. 3**).
- ☑ Headache and backache may occur in older children, and vomiting and abdominal pain occur in 25% of cases.
- ☑ Characteristic lesions, present on the anterior tonsillar pillars, soft palate, uvula, tonsils, posterior pharyngeal wall, and, occasionally, the posterior buccal surfaces.
- ☑ Lesions are discrete 1–2 mm vesicles and ulcers that enlarge over 2–3 days to 3–4 mm and are surrounded by erythematous rings that vary in size up to 10 mm. The number of lesions can range from 1 to >15, but is most commonly around 5.
- ☑ Fever generally lasts 1–4 days, and resolution of symptoms occurs in 3–7 days.



Fig. 3: Herpangina.

Diagnosis

- ☑ The diagnosis of HFMD is usually made clinically.
- ☑ The virus can be detected in the stool for about 6 weeks after infection; however, shedding from oropharynx is usually <4 weeks.
- ☑ When etiologic confirmation is necessary, throat, stool, and vesicular fluid samples should be obtained for cell culture or nucleic acid amplification [polymerase chain reaction (PCR)].
- ☑ Light microscopy of biopsies or scrapings of vesicles will differentiate HFMD from varicella zoster virus and herpes simplex virus. Both varicella and herpes have multinucleated and giant cells in smears taken from the moist skin exposed when a vesicle is removed (Tzanck smear). Giant cells are not present in lesions of HFMD.

Differential Diagnosis

- ☑ Aphthous ulcers
- ☑ Herpetic gingivostomatitis
- ☑ Varicella
- ☑ Measles
- ☑ Erythema multiforme
- ☑ Rickettsial fever
- ☑ Scabies
- ☑ Stevens-Johnson syndrome

Treatment

- ☑ Management is supportive, directed toward the relief of pain, lowering of fever, and adequate oral hydration because of the self-limiting nature of HFMD. Admission and intravenous fluids might be required if the child is unable to taking orally, dehydrated, clinically ill, or in case of CNS or cardiac complications.
- ☑ Pain and fever can be managed with nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen but preferably avoided in children with dehydration

Prognosis

Prognosis of HFMD is excellent. Most of the cases recover within few weeks without residual sequelae. Acute illness lasts for 10–14 days. Some may develop serious complications.

Complications

- ☑ Persistent stomatitis with painful ulcers severe enough to cause dehydration
- ☑ *CNS complications (more common with Enterovirus 71 than Coxsackievirus):* Rhombencephalitis (brainstem encephalitis), acute flaccid paralysis, aseptic meningitis, Guillain–Barré syndrome, acute cerebellar ataxia, and benign intracranial hypertension
- ☑ Interstitial pneumonia, pulmonary edema, and pulmonary hemorrhage
- ☑ Myocarditis and pancreatitis
- ☑ Onychomadesis

Prevention

- ☑ Proper hygiene—handwashing after contact with patient and after diaper handling
- ☑ Disinfection of surfaces and toys
- ☑ Avoid close contact and sharing of utensils and cups with infected persons
- ☑ Proper disposal of wastes

Further Reading

- ☑ Dinulos J. Habib's Clinical Dermatology: A Color Guide to Diagnosis and Therapy, 7th edition. Amsterdam, Netherlands: Elsevier; 2019. pp 529-30.
- ☑ Guerra AM, Orille E, Waseem M. Hand, foot, and mouth disease. Treasure Island (FL): StatPearls Publishing; 2022.
- ☑ Messacar K, Abzug MJ. Nonpolio enteroviruses. In: Kliegman RM, St Geme J (Eds). Nelson Textbook of Pediatrics, 21st edition. Amsterdam, Netherlands: Elsevier; 2019. pp. 1690-97.
- ☑ Romero JR. (2022). Hand, foot, and mouth disease and Herpangina. [online] Available from <https://www.uptodate.com/contents/hand-foot-and-mouth-disease-and-herpangina>. [Last accessed May, 2022].
- ☑ Saguil A, Kane SF, Lauters R, Mercado MG. Hand-Foot-and-Mouth Disease: Rapid Evidence Review. Am Fam Physician. 2019;100(7):408-14.