

This podcast can be accessed at www.pedscases.com, Apple Podcasts, Spotify, or your favourite podcasting app.

Hand, Foot, and Mouth Disease (HFMD)

Developed by Beenu Bajwa and Dr.Wingfield Rehmus for PedsCases.com.

September 21, 2024

Introduction:

Hi everyone! My name is Beenu Bajwa, and I am a third-year medical student at the University of British Columbia. This PedsCases podcast was created with support and guidance from Dr. Wingfield Rehmus, a dermatologist practicing at BC Children's Hospital. This PedsCases podcast is designed to give you an approach to Hand, Foot, and Mouth Disease (HFMD), an acute viral illness that commonly affects children.

Learning Objectives

By the end of this podcast, you will be able to:

1. Define and describe the clinical presentation of HFMD.
2. Discuss the etiology and pathophysiology of HFMD.
3. Review the differential diagnosis and management strategies for HFMD.
4. Counsel caregivers on prevention and supportive care for HFMD.

Clinical Case

Let's begin with a brief clinical case.

You are a third-year medical student on your pediatrics rotation, and you see your first patient of the day, Will, a 3-year-old male, accompanied by his father. Will presents with a 2-day history of fever, sore throat, and a rash on his hands and feet. His father mentions that Will has been fussy, has had a decreased appetite, and has been refusing to drink fluids. Will attends daycare and his immunizations are all up to date.

On physical examination, Will appears uncomfortable but alert. You note erythematous macules on his palms and soles, some of which have developed into grayish vesicles. There are also vesicles and ulcerations in his oral mucosa, particularly on the buccal surfaces and tongue. There is no significant lymphadenopathy, and his vital signs are stable.

Will's father is concerned and asks what might be causing these symptoms?

What is HFMD?

Hand, Foot, and Mouth Disease (HFMD) is an acute, self-limited viral illness that causes small erythematous macules in the mouth and erythematous macules which develop into gray, oval, or football-shaped vesicles on an erythematous base on palms, soles, and occasionally other sites such as the buttocks and genitalia.¹ HFMD is predominantly caused by coxsackieviruses, particularly Coxsackievirus A16 and Enterovirus 71, though other Enterovirus species can also be responsible.¹

Developed by Beenu Bajwa and Dr.Wingfield Rehmus for PedsCases.com.

September 21, 2024

Pathophysiology

HFMD is highly contagious and is commonly transmitted in daycare centers, schools, and summer camps. Transmission occurs via the oral-oral or fecal-oral route and through respiratory secretions, vesicular fluid, and fomites such as common diaper changing areas and shared toys.^{1,2} The incubation period is approximately 3-6 days.^{1,2} The virus multiplies in the lymph tissue of the lower intestine and throat, then spreads to nearby lymph nodes. From there, it can spread to various organs, including the skin, brain, heart, and liver.³ Infected children are most contagious in the first week of illness, but can shed virus for several months.

Clinical Features

The typical clinical course begins with nonspecific prodromal symptoms such as mild fever, sore throat, malaise, and reduced appetite. Within 1-2 days, the fever subsides, and small, erythematous macules appear in the oral cavity, which may progress to vesicles and ulcerations, causing significant discomfort.^{1,4} Concurrently or shortly after, similar lesions appear on the hands, feet, and occasionally other areas such as the buttocks and genital region. Grayish, football-shaped vesicles appearing in the typical locations confirm the diagnosis. These vesicles are generally nonpruritic but can develop into painful ulcers. HFMD is more frequently seen during the summer and early autumn.¹

In some cases, particularly with Coxsackievirus A6, more extensive vesicle formation may occur, including on the forearms, legs, and around the mouth.⁴ Severe cases, especially those caused by Enterovirus 71, can lead to complications involving the central nervous system, such as encephalitis, as well as cardiopulmonary failures, such as myocarditis and pulmonary edema.⁵

Another interesting and lesser-known sequela of HFMD is the potential for nail changes, specifically onychomadesis, which refers to the shedding of the nails.⁶ This phenomenon can occur several weeks to months following the initial infection. Onychomadesis manifests as a separation of the nail plate from the nail bed, leading to the eventual shedding of the affected nails. While this can be alarming to parents, it is generally a benign and self-limiting condition, with nails typically regrowing without long-term consequences.⁷

Differential Diagnosis

Although HFMD is primarily a clinical diagnosis, some important differential diagnoses to consider include herpangina, varicella, and aphthous ulcers.¹ Unlike HFMD, herpangina lesions are confined to the posterior oral cavity and do not appear on the hands or feet.⁵ Chickenpox lesions caused by the varicella-zoster virus are generalized and itchy, in contrast to the localized and typically non-itchy lesions of HFMD.^{1,5} Lastly, aphthous ulcers are also found inside the oral cavity but generally do not form vesicles, are not present on the skin around the mouth, the hands, or the feet. They are less likely to be associated with systemic symptoms such as fever, malaise, and sore throat.^{1,5}

Management

Management of HFMD is primarily supportive, as it is a self-limited illness.⁵ Key aspects include ensuring adequate hydration, managing pain, and maintaining good hygiene to prevent secondary infections.¹ Antipyretics like acetaminophen or ibuprofen can be used to reduce fever and discomfort. Topical oral anesthetics may provide symptomatic relief for painful oral lesions.¹

Counseling and Prevention

Parents should be advised on the importance of hand hygiene and disinfecting contaminated surfaces to prevent the spread of HFMD. Since the virus is transmitted by oral-oral or fecal-oral route, special care should be taken around diaper changes and toileting as well as with sanitizing toys that children put into their mouths. Caregivers should ensure children remain hydrated and provide soft, bland foods to ease oral discomfort. In order to prevent transmission, children should be kept out of daycare or school until fever resolves, they feel well enough to participate in activities and the vesicles and sores have crusted over.

Conclusion

To summarize, here are the key take-home points:

1. HFMD is an acute, self-limited viral illness primarily affecting children, characterized by a vesicular rash on the hands, feet, and oral mucosa.
2. It is most commonly caused by Coxsackievirus A16 and Enterovirus 71, and transmission occurs through the fecal-oral route and respiratory secretions.
3. Management is supportive, focusing on hydration, pain relief, and hygiene.
4. Parents should be counseled on preventing transmission through good hygiene practices and keeping affected children home during the acute phase of illness.

Thank you for listening to our PedsCases podcast!

References

1. Ulloa, G., Krueger, L., Wong, V., & Burgin, S. (2024). Hand, foot, and mouth disease. VisualDx.

2. Centers for Disease Control and Prevention. (2024). Hand, foot, and mouth disease. In CDC Yellow Book 2024: Health Information for International Travel. Retrieved from <https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/hand-foot-and-mouth-disease>
3. Guerra, A. M., Orille, E., & Waseem, M. (2023). Hand, foot, and mouth disease. In StatPearls. Treasure Island, FL: StatPearls Publishing. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK431082/>
4. Esposito, S., & Principi, N. (2018). Hand, foot and mouth disease: current knowledge on clinical manifestations, epidemiology, aetiology and prevention. *European Journal of Clinical Microbiology & Infectious Diseases*, 37(3), 391–398.
5. World Health Organization. Regional Office for the Western Pacific. (2011). A guide to clinical management and public health response for hand, foot and mouth disease (HFMD). Retrieved from <https://iris.who.int/handle/10665/207490>
6. Gan, X. L., & Zhang, T. D. (2017). Onychomadesis after hand-foot-and-mouth disease. *CMAJ: Canadian Medical Association Journal*, 189(7), E279. <https://doi.org/10.1503/cmaj.160388>
7. Xavier, J. P. O., & Junior, J. C. C. X. (2020). Onychomadesis secondary to hand-foot-and-mouth disease: report of two cases. *Anais Brasileiros de Dermatologia*, 95(2), 266–268. <https://doi.org/10.1016/j.abd.2019.06.011>