

Hand-foot-and-mouth Disease

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Hand-foot-and-mouth disease is a highly contagious disease most often seen in children during the summer. It is caused most commonly by the virus coxsackie A16, but other enteroviruses have been implicated. It presents with low grade fever, and a vesicular eruption on the hands, feet, and mouth. More serious manifestations are seen less commonly. Diagnosis is most often clinical and treatment is symptomatic in nature. The infection in a male adult is presented.

A viral syndrome of oral, hand, and foot lesions was first described in Toronto in 1958 by Robinson et al¹. The term "hand-foot-and-mouth disease" was used by Alsop et al² in England in 1959. It is primarily a disease of children, although it may be seen in adults. It is most commonly caused by coxsackie A16 which is an enterovirus but is also associated with other serotypes, A5, A7, A9, A10, B2, and B5 viruses and enterovirus 71.¹ The enterovirus 71 infection is sometimes seen in association with central nervous system disease. The A16 serotype is often responsible for epidemics in the summer and early fall, although it has been reported in the winter.³

The disease has been reported worldwide including the US, Canada, Great Britain, Sweden, Germany, Czechoslovakia, Australia, South Africa, and Norway.⁴ The coxsackie virus, along with echoviruses, enteroviruses, and polioviruses, belongs to the group known as enteroviruses which is itself a subgroup of picornaviruses (small RNA viruses).

Humans are thought to be the only natural host of these human viruses. Transmission is from person to person through the fecal-oral route and possibly by the oral-oral route. Children are the main susceptible group. The spread is horizontal from child to child and then vertical within family groups. The pathogenesis of hand-foot-and-mouth disease

is thought by Cherry and Nelson⁵ to be typically enteroviral with primary viral implantation in the mucosa of the throat and the ileum on the first day. This is immediately followed by multiplication of the virus in the throat and ileum. Extension to regional lymph nodes occurs on the next day. Viremia occurs by the third day and after, followed by multiplication of the virus in secondary infection sites. Antibodies appear by the seventh day, and viremia ceases, and there is decreased viral content in secondary infection sites.⁴ The incubation period is from 3 to 6 days. The skin lesions of coxsackie A16 virus infections have been reported to be chronic and recurring.

Clinically, hand-foot-and-mouth disease presents with a mild prodrome consisting of malaise and a low grade fever. Symptoms of a cold, or abdominal pain and mild diarrhea, may also present initially along with frank oral lesions. The initial presentation is often a painful mouth or throat, especially in children. Children may refuse to eat because of pain. Symptoms seem to be inversely proportional to age.³

The characteristic exanthem is usually seen along with or shortly after the appearance of the oral lesions. These lesions are seen most often on the hands and feet. This predilection for the hand, foot, and mouth is unexplained. Lesions may be few or many in number and may be seen on the extensor surfaces of the hands and feet or on the palms, soles, and digits. Lesions are sometimes seen on the face, arms, knees, or buttocks in children. The lesions are generally painless, but those on the palms and soles may be sore. The typical

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nonmucosal lesions begin as an erythematous macule that soon evolves into a vesicle that can become tense. Histologically, the vesicles are located intraepidermally with spongiosis, epidermal exocytosis, and some individual cell necrosis. Viral particles can be shown on electron microscopic evaluation.⁶

The oral lesion generally presents as an erosion or shallow ulcer within the oral cavity; these may be on the hard or soft palate, gingiva, buccal mucosa, or tongue. Lesions generally resolve within 1 to 2 weeks without any sequelae. Relapses have been reported. Serious sequelae have been reported after severe infections; these have included paralysis, meningitis, and myocarditis.³

Diagnosis is usually made clinically based on appearance and distribution of lesions, although throat washings, stool, or vesicular fluid can be cultured and typed. Differential diagnoses include herpes simplex and varicella-zoster lesions. Patients with hand-foot-and-mouth disease invariably have lesions of the oral cavity.

In contrast, oral lesions are less common in chickenpox; additionally, patients with chickenpox generally appear sicker, and their lesions are more extensive and centrally distributed. The lesions usually spare the palms and soles. Also, the lesions of chickenpox evolve to form pustules and scabs, unlike hand-foot-and-mouth disease. Patients with herpetic lesions of the mouth and gums also appear sicker, with higher fevers and cervical lymphadenopathy. Their lesions generally involve the oral cavity only and do not involve the extremities.

Another viral infection, herpangina, also resembles hand-foot-and-mouth disease. However, these lesions generally occur posteriorly in the oral cavity and typically involve the fauces and soft palate. Herpangina is generally associated with a higher temperature. A vesicular eruption on the feet and hands might also be confused with a vesicular tinea infection of the soles presenting with the same reaction on the hands. This would not be associated with any systemic symptoms nor would any oral lesions be seen. Additionally, the vesicles seen in tinea are not associated with an erythematous halo.

Case Report

A 46-year-old male presented for evaluation of tender bumps on his toes and soles bilaterally during July 1994 (Fig. 1). He reported noticing the bumps 2 days prior to this visit. A sore spot on the bottom of his right small toe caused him to look at his feet



Figure 1. Typical lesions of hand-foot-and-mouth disease. Early lesions on hallux are erythematous macules and papules. Later, the lesion on the finger is a vesicle with clear fluid on an erythematous base.

and notice the lesions. He observed a small blister-like lesion with a surrounding halo of redness. The blister appeared to be filled with a clear fluid and was tender to firm pressure. He reported that he had been feeling as if he had a mild flu with a headache, and mild upset stomach. Further questioning revealed that his 2 1/2-year-old daughter had similar lesions on her hands and feet that had begun approximately 3 days prior to his own. She had a fever and was irritable at the time.

The physical examination revealed a generally healthy male in no acute distress. Vital signs were within normal limits as was the neurovascular examination. The dermatologic examination revealed multiple, 3-mm to 4-mm vesicles on the palms, fingers, soles, and toes. The lesions were in various stages of development ranging from erythematous macules, to small tense vesicles, to resolving vesicles with resorption of vesicular fluid.

Lesions were noted on the plantar aspect of the digital pulp of the digits, the plantar aspect of the foot from the sulcus to the heels and on the sides and palmar surface of the fingers, and the palmar surface of the hands. Observation of the oral cavity revealed a single shallow erosion on the buccal surface of the lower gingiva. The arms, legs, face, chest, and back were spared. The skin was otherwise normal.

Several similar lesions developed over the course of the next few days. Based on the history and the typical appearance and distribution of lesions, a diagnosis of hand-foot-and-mouth disease was made. The patient was treated symptomatically with accommodative padding for painful lesions. All lesions were totally resolved, and the patient was well within 3 weeks of the onset of lesions. The patient and his daughter developed a second milder, shorter lived case of hand-foot-and-mouth disease during November 1994, 5 months after the initial episode. The resolution was again unremarkable.

Discussion

Hand-foot-and-mouth disease is generally thought to be a disease of children, yet as this case illustrates, it is seen in adult patients. While most would consider hand-foot-and-mouth disease a rare clinical finding, this case illustrates that the disease is seen and, in fact, is not uncommonly seen in epidemic proportions during the summer. As is important with any contagious disease, diagnosis should be prompt and accurate. A delay in diagnosis will theoretically increase the number of children and adults afflicted.

Although severe cases are rare, initial misdiagnosis will proportionately increase the probability that those more serious cases occur, as contact by infected individuals continues. The probability is also increased for an immunocompromised or elderly individual to be infected through the vertical transmission within a family. Paralysis, meningitis, or myocarditis may then be the consequence.

This case exemplifies why it is necessary to take a complete history from patients. The fact that the patient's young daughter had similar signs and symptoms helped narrow the differential diagnosis. This case shows why podiatric physicians must examine the whole patient rather than just the foot. Finding lesions on the hands, mouth, and feet helped make this diagnosis; not finding lesions on the trunk or face was also important.

Conclusion

Hand-foot-and-mouth disease is a contagious, infectious disease caused by an enterovirus. It is seen most often in children during the summer. Epidemics have been reported. Presentation is typically an enanthem of shallow ulcers and an exanthem of macules evolving to vesicles on the hands and feet. Mild flu-like symptoms are often seen and the treatment is symptomatic. Infection generally results in immunity, although recurrences are possible as this case shows.

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