

Original Research Article

Onychomadesis associated with hand, foot, and mouth disease: a prospective observational study from North Chennai

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ABSTRACT

Background: Hand, foot, and mouth disease (HFMD) is a common febrile illness caused by coxsackievirus A16 and human enterovirus 71 characterized by vesicular eruptions on hands and feet and enanthem on oral mucosa. Resolves usually without complications but onychomadesis can occur as a late sequelae sometimes.

Methods: Children with clinical diagnosis of HFMD between April to June 2018 were included in the study. Age, sex, duration of illness, cutaneous features and nail changes were noted at initial visit and during every week for next 6 weeks.

Results: 58 children were recruited in the study with boys to girl's ratio 1.2:1. The average age was 5.3 years. The vesicular lesions predominantly involved palms and soles (88.3%). 65.5% had history of fever and pruritis was the commonest cutaneous symptom. 27 children (48.21%) developed onychomadesis during follow up with average time interval of 3.2 weeks between the clinical diagnosis and nail shedding. Reassurance about spontaneous resolution of the condition given to the parents.

Conclusions: Our study strengthened the association between the HFMD and occurrence of onychomadesis. Physician's awareness about this benign condition is needed to avoid parental anxiety, unnecessary investigations and treatment for the children.

Keywords: Hand, foot and mouth disease, *Coxsackievirus* A16, *Enterovirus* 71, Onychomadesis

INTRODUCTION

Hand, foot and mouth disease (HFMD) is a common febrile illness of viral etiology affecting the infants and young children caused frequently by *Coxsackie* virus A16 and human enterovirus 71. Traditionally it is characterized by symmetrical maculopapular rash or vesicles on hands and feet and enanthem on oral mucosa. Occasionally more severe presentations and late post infectious sequelae occur including onychomadesis and Beau's lines.¹ There has been increased incidence of the disease in Asia-Pacific region in the last decade with coxsackie A6 as dominant causative agent and reports of HFMD outbreak in India has been reported from time to

time.² This common condition can still be overlooked because of its sequelae which can cause unnecessary parental anxiety resulting in unnecessary treatment. The lack of awareness of these sequelae on the physician's part also adds to the burden. The present study highlights the occurrence of HFMD in North Chennai and its association with onychomadesis.

Aim of the study

The aim of the study was to evaluate the pattern of occurrence of HFMD among children attending dermatology OPD in a tertiary care centre, North Chennai and to study the association between HFMD and occurrence of onychomadesis as a late sequelae.

METHODS

The study was a prospective observational study conducted in the department of dermatology in a tertiary care centre in North Chennai for a duration of 3 months (April to June 2018). Infants and children upto 12 years of age with clinical diagnosis of HFMD attending the outpatient department and those willing for photographic evidence and follow up were recruited in the study. Infants and children with systemic illness, history of nail trauma and taking drugs which causes nail changes were excluded from the study. History was recorded from either of the parents for reliable results. Age, sex and duration of illness was noted. The cutaneous manifestations and nail changes were noted at the initial presentation and during weekly follow up for 6 weeks.

The collected data were entered in excel spreadsheet and analysed with IBM. SPSS statistics software 23.0 version. Categorical variables were analyzed using frequency and percentage analysis and continuous variables were analyzed using mean and standard deviation.

RESULTS

During the study period, out of 2561 total pediatric cases 73 (2.85%) were clinically diagnosed as HFMD. 58 children were included after fulfilling the inclusion and exclusion criteria. The ratio of boys to girls was 1.2:1 (Table 1). The average age of the children was 5.3 years (range 9 months to 12 years) (Figure 1). The area-wise distribution of the vesicular eruptions of HFMD were palms and soles (88.3%) followed by oral cavity (67.8%), buttock (63.2%) and trunk (11%) (Figure 2). 38 (65.5%) had history of fever while rest did not have any such history. The cutaneous symptoms reported were pruritis, pain and burning sensation in order and few children had combination of above features (Table 2).

Table 1: Number of HFMD cases during study period.

	Number		
Total pediatric cases	2561		
Total HFMD cases	73 (2.85%)	Boys - 40	Girls - 33

All the children were followed weekly upto 6 weeks to detect any nail changes. 2 children lost follow up (1 child at 3 weeks and 1 child at 4 weeks). 27 out of 56 children (48.21%) developed nail changes in the form of nail shedding (Figure 3) while rest of the children remained normal. Finger nails were predominantly affected compared to toe nails. There was no association between occurrence of vesicular lesion in the particular finger and development of nail changes later in the same finger noted in the study. The average duration between clinical diagnosis of HFMD and development of onychomadesis

was 2.6 weeks (range 0-5.4 weeks) (Figure 4). Two children had concurrent skin lesions and onychomadesis at the initial visit itself. The onychomadesis resolved spontaneously without any treatment in all children.

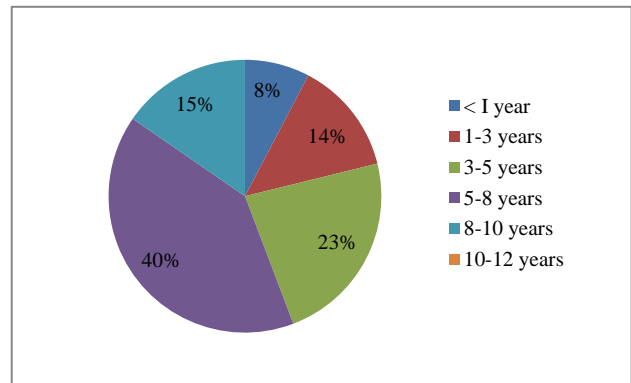


Figure 1: Age distribution of children in our study.



Figure 2: Vesicular eruption of HFMD in palm and knee in a 2 years old child.

Table 2: Cutaneous symptoms in the study.

Symptom	Number	Percentage
Pruritis	41	70.6
Pain	26	44.8
Burning sensation	17	29.3

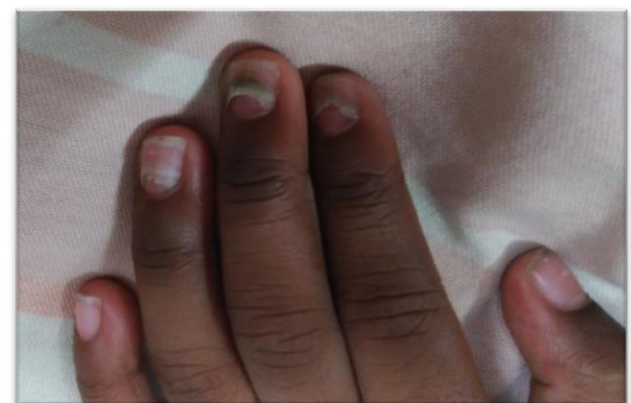


Figure 3: Onychomadesis following HFMD in a 5 years old child.

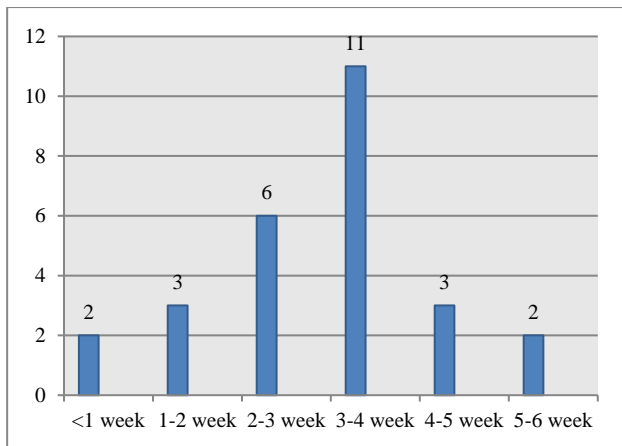


Figure 4: Duration between HFMD and development of onychomadesis.

DISCUSSION

HFMD is an acute infection caused by enterovirus leading to mild prodromal symptoms, oral ulcers and hand and foot vesicular eruptions. The predominant species implicated in epidemics are *Coxsackievirus* (CV) A16, CV A6 and enterovirus 71. Sporadic cases can be caused by CV A2, CV A4, CV A5, CV A9, CV A10, CV B1, CV B4 and CV B5. Children below 10 years are commonly affected.^{3,4}

The onset is with low grade fever, sore throat and malaise. Soon oral blisters appear which breakopen to superficial ulcers. Flaccid greyish 2-5 mm oval vesicles develop on palms and soles and sometimes the buttock. They fade in next 2-3 days. Usually no complications noticed. Rarely myocarditis, pneumonitis, meningitis, encephalitis, Guillain-Barre syndrome and flaccid paralysis can be encountered. Nail changes of Beau's lines, onychomadesis or onycholysis has followed 2-10 weeks post-infection.

Most of the available Indian literature about HFMD and onychomadesis are only case reports and our study is first of its kind from South India. The prospective design of the study is also new when compared to retrospective design of the previous studies. In children, trauma, systemic diseases and drug intake are leading cause of onychomadesis. The association between HFMD and onychomadesis is underestimated because of the long-time interval between the disease and occurrence of nail changes (about a month) and spontaneous resolution of the nail changes. Lack of awareness about this leads to unwanted parental concern and unnecessary treatment for a condition which otherwise resolves spontaneously.

In our study, there was slight male predominance (boys: girls = 1.2 : 1) which was in accordance with Bucak et al and Ghosh et al.^{5,6} The predominant age group affected was 5.3 years in our study which was almost similar to Bucak et al (4.9 years) and Ghosh et al (5.1 years).^{5,6}

But, Li et al and Jeelani et al reported in younger age group of 3.5 years and 2.2 years respectively.^{7,8} Nevertheless, our study is in accordance with literatures that HFMD is common around children of 5 years. Now a days there has been few reports of occurrence of HFMD in adults and pregnant women because of change in the serotype of the viruses.⁹

In our study, the vesicular lesions predominantly involved palms and soles in accordance with previous studies.^{5,6} The second commonest site involved was oral cavity in our study similar to Bucak et al while Ghosh et al reported it as gluteal region. Atypical lesions of HFMD like lesions involving only one body region, lesions in trunk without palms, soles and oral involvement, involvement of genitalia has also been reported.² Fever was noticed in 65.5% in our study which was higher when compared to Ghosh et al (54.8%) and lower when compared to Jeelani et al (70.59%), Bucak et al (82.1%) and Li et al (84.3%).⁵⁻⁸

2 children lost follow-up in 2nd and 3rd week. 27 out of 56 children developed onychomadesis (48.21%). Our results were comparable with Li et al who reported it as 43.1%.⁵ Meanwhile, Ghosh et al noticed no such nail changes during follow up of children with HFMD and Bucak et al reported lower rate of 25.6% in the study.^{3,4} The mechanism of onychomadesis after HFMD is not fully understood. It is attributed to the damage of the nail matrix which can be caused directly by viral replication or indirectly by virus specific immunocomplexes.^{10,11} The difference in the rate of occurrence of onychomadesis in various studies can be attributed to the viral etiology of HFMD where nail changes are more pronounced in infection with coxsackievirus A16 when compared to enterovirus 71.^{12,13} Unfortunately microbiological evidence for causative organism could not established in our study due to limited resources.

The average duration between the clinical diagnosis of HFMD and occurrence of onychomadesis was 3.2 weeks in our study while Jeelani et al reported much longer duration of 5.7 weeks.⁶ But, the results of our study are within the range of 3-10 weeks reported in other studies.^{3,5} Two children had concurrent lesions of HFMD and Onychomadesis at the initial visit itself. This may be due to delay in the clearance of HFMD lesions in these children which normally occurs within a week. Fingernails were predominantly affected compared to toenails. The other nail changes of HFMD beau's lines and transverse leukonychia were not noticed in our study. The parents of the children were given reassurance about spontaneous resolution of onychomadesis and no treatment was encouraged.

Study limitation

The limitations of the study are that the diagnosis of HFMD was purely clinical and microbiological evidence for the causative organism was not established. Also, the

study had followed up period of only 6 weeks when the nail changes of HFMD are said to occur upto 10 weeks post-infection.

CONCLUSION

Our study strengthened the association between the HFMD and occurrence of onychomadesis. Physicians should be aware about this late sequela of HFMD to avoid unwanted treatment of a condition which is benign and resolves spontaneously. Whenever a child presents with onychomadesis and beau's lines, a simple history of febrile illness with skin eruptions about a month ago is sufficient for the diagnosis of this condition rather than subjecting the child to unnecessary investigations. Reassurance about the benign nature of the condition is needed to avoid parental anxiety.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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