

Case Report

Onychomadesis and Beau's Lines- Rare Complications of Hand-foot-and-mouth Disease

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Abstract

Hand-foot-and-mouth disease (HFMD) is a common self-limiting viral infection in children caused by Coxsackievirus A16 and human enterovirus 71, presenting with fever, erythematous papulovesicular eruptions/ blisters on the palms, soles, knees, buttocks, and oral mucosa. Although rare, complications may arise in nails e. g. onychomadesis (nail separation) and Beau's lines (transverse lines on the nails). These typically appear within four to eight weeks of HFMD and persist for around 5-6 weeks. No active treatment is required and these nail changes resolve spontaneously within few weeks as the nail bed remain intact. We present here a boy of 4 years who presented with such nail changes after around 5 weeks of HFMD disease and diagnosed as onychomadesis and Beau's lines after ruling out other possible causes of nail changes.

Keywords: HFMD, Onychomadesis, Nail shedding, Beau's line

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Introduction

Hand-foot-mouth disease (HFMD) is a contagious viral illness in children caused by coxsackieviruses A16 and human enterovirus 71. Symptoms of HFMD include fever and the development of red, blister-like sores on the palms, soles, and inside the mouth.¹ In Malaysia, a study found that the incidence rate of HFMD was 94.3 cases per 100,000 individuals in 2017-2018.² In China, the annual incidence rate ranges from 98.81 to 435.63 cases per 100,000.³ Treatment for HFMD focuses on relieving the symptoms, as complications are rare, although there have been reported cases of pneumonia, rhabdomyolysis, meningitis, shedding of finger or toe nails from the nail bed (onychomadesis) and horizontal ridges on the nails called Beau's line.⁴ This usually occurs four to eight weeks after the disease onset and is typically self-limited.⁵ The nail complications of HFMD reported in this case are uncommon and have not been

documented previously in Bangladesh. Therefore, we are presenting this case for future reference.

Case description

A 4-year-old boy presented with complaints of an itchy vesicular rash on different parts of his body including his hands, feet, buttock and over face. The rash was accompanied by sore throat, cough, and low grade fever which lasted for about 3-4 days. Upon examination, the patient displayed normal vital signs and was active. The skin examination revealed multiple red and blister-like eruptions on the palms and backs of the hands, feet, buttock and oral mucosa. Systemic examination was unremarkable. Following a thorough clinical evaluation, the patient was determined to have HFMD, leading to a supportive treatment approach and became well.

At about 4 weeks of post infection, the child was brought again with color changes in nail that began as a yellow green patch at the proximal end and spreading distally. In a week time, the nails then started to shed from the lunula (visible portion of distal nail matrix) towards the free edge, concomitantly with the appearance of slowly growing new, pink nails (Figure 1) and skin peeling. Few horizontal grooves

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(Beau's lines) running across the nail plates, were also noted. Notably, there were no indications of ongoing infections or recent medication. Based on history, clinical examination, the background of recent HFMD infection, and researching the topic, a diagnosis of onychomadesis and Beau's lines as a result of HFMD was thought of. No active treatment was required and parents were reassured. Subsequently, the patient experienced complete recovery of all finger nails within 2-3 weeks after the initial presentation, as confirmed during follow-up appointments.

Discussion

The disease HFMD is a viral infection that primarily affects children under the age of 10, but cases in adults have been observed.⁶ Symptoms of HFMD include fever, swollen lymph nodes, malaise, a skin rash with blister-like eruptions on the palms, soles, and buttocks, and ulcers over throat, tongue and oral mucosa. It is mainly transmitted through the feco-oral route and is associated with Coxsackievirus A16 and human enteroviruses 71.¹

Nail Complications

While HFMD is generally self-limiting, there have been rare reports of complications and there has been a recent emergence of cases of nail complications e. g. onychomadesis which refers to the separation of nail from the nail bed closer to the base, Beau's line manifests as a white horizontal line indicating halted nail plate growth.^{4,5} Similar cases have been reported in Saudi Arabia⁴, Korea⁷, Lebanon⁸, China⁹, Japan¹⁰ and Brazil¹¹

Pathogenesis

Onychomadesis, a more severe nail disorder compared to Beau's line, can be triggered by various factors including trauma, fever, chemotherapy, and ingestion of certain medications^{11,12}. The condition occurs when the growth of the nail matrix is interrupted, causing the nails to detach from the nail

bed. As a result, proximal nail separation takes place, where a new nail grows independently without any connection to the previous nail.¹¹

Nail changes are becoming a common complication after an acute viral infection, typically appearing within 30 to 90 days^{11,12}. HFMD is often associated with nail changes, with Coxsackievirus A16 confirmed as a common cause and Enteroviruses linked to a lesser extent⁴. It is important to note that nail changes in HFMD are a unique complication, affecting only some nails, on average, four nails are shed¹². The exact cause of onychomadesis (nail shedding) is not fully understood, but researchers have proposed different theories. Hardin J et al.¹³ and Bettoli et al¹⁴ suggest that the virus directly triggers an inflammatory process, leading to halted growth of nail matrix. Additionally, they have also suggested that inflammatory process causes immune complexes to be deposited on the nails leading to a poor blood supply. These mechanisms halt nail growth, causing separation and detachment of the nail bed at its base.^{13,14} However, Chiu et al.¹² propose that onychomadesis is caused by direct damage to the nail matrix due to vesicular lesions from HFMD. Cabrerizo et al.¹⁵ consider that the nail matrix is directly damaged by viral replication, based on the presence of Coxsackie virus 6 in shed nails. Osterback et al.¹⁶ used reverse transcription-polymerase chain reaction to detect CVA6 in fragmented nails from 2 children and 1 parent following an HFMD episode, suggesting that virus replication could damage the nail matrix, resulting in onychomadesis.

Treatment

No active treatment is required as changes resolve spontaneously within weeks. Fortunately, these complications do not have any significant long-term effects on the nails, as the nail bed is still intact.¹⁷

Risk factors & measures to exclude other causes of Onychomadesis

Causes of Onychomadesis¹⁸

Etiology	Possible causes
Infectious	Hand-foot-and-mouth disease, varicella infection, scarlet fever, fungal infections
Systemic/dermatologic	Periungual dermatitis, Stevens-Johnson syndrome, toxic epidermal necrolysis, lichen planus, Kawasaki disease
Drug related	Chemotherapeutic agents, valproic acid, carbamazepine, lithium, azithromycin
Other	Nail trauma, familial causes, idiopathic causes

Onychomadesis, a condition characterized by the shedding of nails, can be caused by various factors such as viral infections, autoimmune disorders, medication side effects, and physical trauma¹⁸. However, the exact cause is often unknown. Athletes, particularly runners, may be more susceptible to toenail involvement in this condition.¹⁸ To determine the cause, a thorough history taking into account potential causes, a review of medication history, and a physical examination to identify signs of systemic disease can help narrow down the diagnosis and exclude other possible causes.

Our case & argument

In this case report and literature review, onychomadesis (nail shedding) and Beau's lines (indented lines on the nails) were seen after the patient's symptoms had resolved. The patient was in good health without any systemic illness or medication that could explain the development of these nail disorders. A possible link between onychomadesis, Beau's line, and Hand, Foot and Mouth Disease (HFMD) is suspected as the nail manifestations appeared after the acute viral illness, characteristics of HFMD. While onychomadesis does not cause serious complications, it can't be a concern for parents.

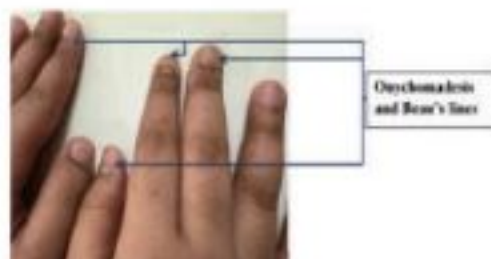


Figure 1: On the thumb, index and middle finger of both hands, there are nail changes- onychomadesis and Beau's lines secondary to HFMD

Conclusion

Onychomadesis and Beau's lines are two rare nail complications of hand-foot-mouth-disease, which used to occur after few weeks the disease HFMD has resolved. This is the first documented case of onychomadesis and Beau's lines in Bangladesh following hand-foot-mouth disease (HFMD). Following this, eight additional cases were identified, all exhibiting similar nail abnormalities, all of whom

recovered spontaneously without complications. The exact cause behind these nail changes are unknown but are thought to result from inflammation-induced nail growth disruption. The complications are self-limiting and therefore, the health care providers should not give unnecessary medication apart from counseling & reassurance of the parents and watchful observation.

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