

Beau's Line and Onychomadesis after Hand-Foot-Mouth Disease

Min Woo Kim, Bo Ri Kim,
Sang Young Byun,
Hyun-sun Yoon,
Soyun Cho and
Hyun-sun Park

Received: Oct 02, 2015, Accepted: Oct 16, 2015, Published: Sep 09 2015

Department of Dermatology, Seoul
National University Boramae Hospital,
Seoul, Korea

Cases and Methods

Hand-foot-mouth disease (HFMD) is caused by enterovirus or Coxsackie virus (CV) infection. It is characterized by palmoplantar vesiculopustular eruption and erosive stomatitis [1], which enables differential diagnosis from herpangina, aphthous stomatitis, and Kawasaki disease. There are several case reports on the nail presentation of HFMD [1-10], but some clinicians are not yet familiar with this phenomenon and can make a misdiagnosis leading to unnecessary treatment. Herein we report two cases of onychomadesis that developed after HFMD. The first case was a 26-month-old boy who presented with a nail deformity on October 2, 2013. His mother mentioned that she found the deformity 1 week prior. His past medical history was insignificant except for previous febrile HFMD that was diagnosed by a local pediatrician in August. There was no history of nail trauma, previous hand dermatitis, or drug use other than acetaminophen during the course of the febrile HFMD. Laboratory test results, including complete blood cell count, admission panel, zinc, magnesium, iron, and ferritin levels, were within normal limits. Physical examination showed shedding of both thumbnails and the right index fingernail with normal proximal regrowth (Figure 1). His toenails appeared normal. The second case was a 25-month-old boy who presented with a similar nail deformity on October 30, 2013, which developed 1 month previously. His past medical history was insignificant except for nonfebrile HFMD in August. Laboratory test results, including complete blood cell count, admission panel, and zinc and ferritin levels, were within normal limits. There was no history of nail trauma, previous hand dermatitis, or drug use. Physical examination showed subtle transverse ridging of the fingernails and shedding of the toenails and fingernails with normal proximal regrowth (Figure 2).

Discussion

HFMD has been associated with nail matrix arrest [2,11]. Beau's line is defined as a transverse groove resulting from temporary interruption of the nail plate formation [1]. Onychomadesis is considered an extreme form of Beau's line with subsequent separation of the nail plate [1]. Nail matrix forms the hard nail plate, and events affecting nail matrix may cause incomplete nail plate formation such as Beau's lines or onychomadesis. Several proposed etiologies of these changes include drug exposure

Corresponding author:
Hyun-sun Park

✉ snuhdm@gmail.com

Department of Dermatology, Seoul
National University Boramae Hospital, 425,
Shindaebang-2-dong, Dongjak-gu, Seoul,
156-707, Korea.

Tel: 82-2-870-2880
Fax: 82-2-831-0714

Citation: Min Woo Kim, Bo Ri Kim,
Sang Young Byun, et al. Beau's Line and
Onychomadesis after Hand-Foot-Mouth
Disease. Clin Pediatr Dermatol. 2016, 1:1.

(Chemotherapy, anti-epileptic drugs, retinoids), infection, fever, systemic diseases, and nutritional deficiency [1,12]. The mechanism of nail matrix arrest has not yet been elucidated. Inhibition of cellular proliferation or a different quality (thinner and dystrophic) of the produced nail during the event are plausible hypotheses [2]. Several reports describe nail matrix arrest after HFMD, but its mechanism remains unclear. A recent prospective study observed a 5-year-old boy with HFMD who developed onychomadesis only on the nails having cutaneous HFMD lesions and suggested that nail dysfunction due to direct inflammation spreading from skin eruptions around nail is among the causes of onychomadesis linked to HFMD [5]. Nail matrix arrest recovers and normal nail regrowth usually occurs after several weeks [1,2,5]. Various viruses, including CVA6, CVA10, CVA16, CVB1, CVB2, and an unidentified non-polio enterovirus, are reported pathogens associated with a nationwide outbreak of HFMD-related onychomadesis [1]. The absence of onychomadesis in HFMD epidemics caused by other viral strains (enterovirus 71 in Southeast Asia) supports the hypothesis that specific strains

are responsible for this manifestation [13]. Furthermore, nail matrix arrest develops more frequently in HFMD patients with CVA6 infection than in HFMD patients with non-CVA6 infection (37% vs. 5%, $p < 0.05$) [14]. Unfortunately, in the present two cases, pathogens from previous HFMD could not be identified. However, their nail changes probably resulted from previous HFMD during the summer, the epidemic period of HFMD in Korea, and they were likely infected with the viral strain that is able to induce nail matrix arrest. We also performed blood tests to exclude other etiologies which enable nail changes including

nutritional deficiency in our cases. Although the causes of presented nail deformities could not be definitely proven, the temporal relationship and the absence of possible causes of nail matrix arrest other than HFMD support this suggestion.

Conclusion

Clinicians should be aware of nail changes after HFMD because they can be easily overlooked and underestimated owing to latency. Further studies are required to elucidate the exact pathomechanism of HFMD-associated nail matrix arrest.



Figure 1 Onychomadesis of both thumbnails and the right index fingernail (Case 1).



Figure 2 (A) Onychomadesis (arrowheads) and transverse nail ridging (arrow). (B) Subtle transverse ridging (Beau's line).

References

- 1 Bettoli V, Zauli S, Toni G, Virgili A (2013) Onychomadesis following hand, foot, and mouth disease: a case report from Italy and review of the literature. *Int J Dermatol* 52: 728-730.
- 2 Clementz GC, Mancini AJ (2000) Nail matrix arrest following hand-foot-mouth disease: a report of five children. *Pediatr Dermatol* 17: 7-11.
- 3 Davia JL, Bel PH, Ninet VZ, Bracho MA, Gonzalez-Candelas F et al (2011) Onychomadesis outbreak in Valencia, Spain associated with hand, foot, and mouth disease caused by enteroviruses. *Pediatr Dermatol* 28: 1-5.
- 4 Tay L, Lee SJ (2013) Onychomadesis following childhood hand-foot-mouth disease in two pairs of siblings- a familial predisposition? *Dermatol Online J* 19: 20036.
- 5 Shikuma E, Endo Y, Fujisawa A, Tanioka M, Miyachi Y (2011) Onychomadesis developed only on the nails having cutaneous lesions of severe hand-foot-mouth disease. *Case Rep Dermatol Med*: 324193.
- 6 Shin JY, Cho BK, Park HJ (2014) A Clinical Study of Nail Changes Occurring Secondary to Hand-Foot-Mouth Disease: Onychomadesis and Beau's Lines. *Ann Dermatol* 26: 280-283.
- 7 Apalla Z, Sotiriou E, Pikou O, Lefaki I, Lallas A, et al. (2015) Onychomadesis after hand-foot and -mouth disease outbreak in northern Greece: case series and brief review of the literature. *Int J Dermatol* 54: 1039-1044.
- 8 Miyamoto A, Hirata R, Ishimoto K, Hisatomi M, Wasada R, et al. (2014) An outbreak of hand-foot-and-mouth disease mimicking chicken pox, with a frequent association of onychomadesis in Japan in 2009: a new phenotype caused by coxsackie virus A6. *Eur J Dermatol* 24: 103-104.
- 9 Kim EJ, Park HS, Yoon HS, Cho S (2014) Four cases of onychomadesis after hand-foot mouth disease. *Ann Dermatol* 26: 777-778.
- 10 Liang KT, Joyce SSL (2012) Onychomadesis associated with childhood hand-foot-mouth disease. *Proceedings of American Academy of Dermatology* 66: Supplement 1. p: AB99.
- 11 Bernier V, Labreze C, Bury F, Taieb A (2001) Nail matrix arrest in the course of hand, foot and mouth disease. *Eur J Pediatr* 160: 649-651.
- 12 Scheinfeld N, Dahdah MJ, Scher R (2007) Vitamins and minerals: their role in nail health and disease. *J Drugs Dermatol* 6: 782-787.
- 13 Chan KP, Goh KT, Chong CY, Teo ES, Lau G, et al. (2003) Epidemic hand, foot and mouth disease caused by human enterovirus 71, Singapore. *Emerg Infect Dis* 9: 78-85.
- 14 Wei SH, Huang YP, Liu MC, Tsou TP, Lin HC, et al. (2011) An outbreak of coxsackievirus A6 hand, foot, and mouth disease associated with onychomadesis in Taiwan, 2010. *BMC Infect Dis* 11: 346.