

Clinical Letter

Beau-Lines of the fingernails in association with pediatric SARS-CoV-2 infections

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Dear Editors,

We report a family cluster of SARS-CoV-2, where both parents and two out of three children became infected with the novel coronavirus COVID-19. The introduction of COVID-19 to Germany was reported to have occurred via a Chinese business delegate travelling to Munich in January 2020 [1]. Four co-workers subsequently became primarily infected after a business meeting. The father of the described children had no direct contact to the mentioned Chinese visitor, but to an infected coworker, representing a secondary transmission. The described pediatric patients were the first reported children with SARS-CoV-19 in Germany and represent a tertiary transmission [2]. With only eight days between the business

meeting with the Chinese visitor and the first positive COVID-19-PCR of the child, and three transmission cycles, the incubation period may have been as short as 72 hours.

Since there was little experience with SARS-CoV-19 in German hospitals and in the public health sector in general at that time, the family was hospitalized together upon the family's request, and treated in an isolated tract of the hospital. The two COVID-19-positive children, two and five years old, only showed brief symptoms of fever and gastroenteritis, but no respiratory symptoms. They had a white cell count of 6000/ μ L (absolute neutrophil count of 2100/ μ L) and 2500/ μ L (absolute neutrophil count of 1100/ μ L), respectively. Both children tested PCR-positive for COVID-19 in consecutive nasal and pharyngeal swabs, and cleared the virus in the pharyngeal tract after five days. However, multiple stool specimens continued to be PCR-positive for more than four weeks. Additional viral infections by influenza A or B, parainfluenza, human metapneumovirus, respiratory syncytial virus and adenovirus were excluded. Interestingly, the third child (7 months old) remained asymptomatic and Covid-19-PCR negative despite continuous exposure to the rest of the family, and despite being breastfed. The family remained together in hospital quarantine for one month [2].

Interestingly, both children, A and B, developed Beau lines of all fingernails three weeks after symptom onset (Figure 1a–c). Given the history of these two previously



Figure 1 Beau lines (arrows) of the fingernails in pediatric patients with SARS-CoV-2 disease three weeks after PCR-diagnosis (a–c). Fingernails four months after recovery from SARS-CoV-2 disease (d).

healthy children, the occurrence of Beau lines on the fingernails in both children was attributed to the infection itself, as previously suggested for other systemic infections such as mumps and syphilis [3]. Alternatively, however, the high levels of stress caused by circumstances of the hospital isolation could also have been a trigger. Josef Beau described transverse furrows of the nails in 1846 in the context of fever [4], and Beau lines were described in association with an outbreak of the Asian Flu in the United States in the years 1968/1969 [5], where they usually appeared about two months after onset of the disease. Beau lines in the fingernails and toenails of a 45-year-old male, appearing three months after diagnosis of a COVID-19 associated disease, have also been described recently [6]. Other dermatologic manifestations such as papulovesicular rashes, erythema multiforme-like rashes, enanths and retiform purpura have also been described in association with COVID-19 [7, 8], whereas nail changes occurred only in 0.6 % of cases [8].

The mechanism by which systemic illness leads to alterations in nail growth and to the appearance of transverse furrows is unknown. It has been suggested that insult to the nail matrix results in transient growth inhibition with subsequent recovery and thus the appearance of the transverse superficial grooves, usually more marked in the middle aspect of the nail, characteristic of Beau lines [3]. Dermatologic diseases involving different immunological signaling pathways are directly affected by COVID-19 [9]. Similarly, SARS-CoV-2 may itself cause immunological changes, leading to lymphopenia as observed in the described pediatric patients, cytokine storms, and further organ damage [10].

The children's fingernails recovered spontaneously four months after the SARS-CoV-2 illness (Figure 1d).

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Conflict of interest

None.

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