Nail Layering Phenomenon and Its Neutraceutic Therapy

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Case Presentation

A great variety of nail abnormalities were observed in a labor camp 1958-1962 before and during Nationwide Hunger in China [1,2]. One of them was nail layering, about 75% in occurrence. Under severe malnutrition, nail plate was observed to have layering after the destruction of its normal tiny parts, hyponychium and onychodermal band underneath [3]. The hyponychium is a strip of epithelium beneath the nail plate. It seals the subungual space and allows the nail plate to detach from the nail bed. The onychodermal band seals the nail plate and the hyponychium. These two parts seal the extended free edge of the nail plate and protecting the nail bed. When they were destroyed, the sealed portion of the finger tip and the lower surface of the free edge of nail plate exposed to the environment and lost protection. Then the nail separated into two layers with their junction about 2-4 mm away from the very end of the finger tip as seen in (Figure 1).

The upper layer became very thin, brittle, flattened or even spoon-like (koilonychia). The lower layer was a soft, flattened mass like dirty rubber lump inseparable from underlying finger tissue. In advanced cases, the junction might reach the transverse middle portion of the nail, about 7mm away from the very end of the finger tip. Upper layer like this was extremely vulnerable to daily wear and tear. Once it was broken by accident, the lower layer underneath revealed as grayish-yellow colored multiple, longitudinal, parallel ridges and grooves, not a lump. This should be the epidermis attached to dermis, called matrix crestse (cristae matricis unguis), on the nail bed. Epidermis and particularly its underlying dermis might deeply involve in the pathogenesis of some nail abnormalities, such as surface longitudinal ridges, dark band, and especially the terrible intra-nail hemorrhage [1]. Unfortunately, no picture could be taken and no way to report in that terrible years.

In civil cases, nail layering including finger fissures as in the slavery labors was very rare. However, a severe case was found with thick and hard upper layer but no lower layer, which became an empty space underneath for 64 years. Her unique abnormal nails were normalized during thiamin therapy for her coronary insufficiency as reported in the following.

Case Description

Patient WSF was an 85 years old housewife in Tianjin west. For many years, she had visited multiple top hospitals in Tianjin for her coronary insufficiency with frequent breathlessness, palpitation, chest tightness or pain, leg edema, and general lassitude. Medication included nicergline, isosorbide mononitrite, aspirin, aminophylline and occasionally some others. Clinical signs and symptoms had not been improved but persisted. She then visited this author’s tele-Clinic on October 10, 2016 for cardiac problem.
Eight nails were completely normalized after 15 weeks of therapy. Therefore, nutrition therapy continued for totally 6 months.

When she was 21 years old, every day she worked outside in the cold winter without hand gloves to pull and push a heavy stone roller to press reed-like calamus for weaving commercial products. All her fingers were severely injured with cold. At the beginning, the nail on each finger became very thin, brittle, and flattened or spoon-like. An empty space of the nail size and about 2-3 mm in thickness developed under the brittle thin nail. However, unlike that in slave cases, the upper layer of her 10 nails gradually became very thick and hard without flexibility through 64 years. It was very difficult in manicure because no pictures could be taken in the labor camp.

All her above medicine were totally canceled and only thiamin 300mg plus VB complex one ampule (containing VB1 10mg, VB2 2mg, niacinamide 30mg, VB6 2mg, pantothenic acid 1mg) twice and occasionally once a day were intra-muscularly injected. She became completely free from cardiac signs after 3 months. Very gladly, her unique nail abnormality for 64 years was observed recovering from the 7th week of thiamin therapy. Therefore, nutrition therapy was absent and replaced by an empty space under each affected nail. There was a small breaking defect in the right thumb nail tip due to falling down in January 2017. Totally, the patient received parenteral thiamin for six month. Both cardiac signs and the 8 finger nails were normal but the thumb nails improved very sluggish and incomplete (Figure 3A&B).

After another 8 weeks of thiamin injection, eight finger nails became normal while the two thumbs nails greatly improved but incomplete as seen in figure 4B. There was a small breaking defect in the right thumb nail tip due to falling down in January 2017. Totally, the patient received parenteral thiamin for six month. Both cardiac signs and the 8 finger nails were normal but the thumb nails improved very sluggish and incomplete (Figure 4A&B).

Discussion

1. This case was quite different from onycholysis [5], in which, there is distal separation of the nail plate from the nail bed. In this case, the nail plate was in its proper location over the nail bed but separated into 2 layers. Unlike milder cases, this patient’s lower layer was absent and replaced by an empty space under each affected nail. After thiamin therapy, the lower layer regenerated. It confirmed that nail layering phenomena observed among the slavery laborers was true and correct. It might be a new clinical entitle and this case might be the first one could be reported with nail layering phenomena because no pictures could be taken in the labor camp.

We called the layers as upper and lower ones before their proper nomenclature available. Her lower layer regenerated in the following order: small finger in first, and then the middle, the index and the ring fingers. Generation of the lower layer of the thumb nails was very sluggish and incomplete probably due to its heavy thickness and the patient old age.

Definitely, the nail sealing parts, hyponychium and onychodermal band, and the nail matrix were severely injured due to cold. Destruction of hyponychium and onychodermal band opened the detrimental way for nail matrix. The germinall matrix (intermediate matrix) became dysfunctional in producing hardened, flat, translucent, non-living, keratin nail cells. Its distal extension, the sterile matrix on the nail bed, totally failed leading to the formation of...
empty cavity. This confirmed that, physical factor, such as severe low environmental temperature, might also injure the sealing parts and matrix of the nail.

2. Parenteral thiamin was exceedingly effective for nail layering both in slavery laborers and this civil case. The vitamin B complex was used to minimizing the possible imbalance among vitamin B group when thiamin was too much. Based on clinical experiences in the labor camp, vitamin D and vitamin B12 might be only secondary important, however, no clinical study to compare. Interpretation of biochemical mechanism of thiamin therapy is beyond the scope of this paper.

3. Long term parenteral thiamin therapy was very effective for coronary insufficiency. It should be discussed in another paper.

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References