thermal and photomechanical reactions². It may be considered that QSNL has a higher risk of PIH, and that long-pulse lasers are more suitable for darker skin types. However, more purpura developed with the long-pulse Nd:YAG technique, and the increased risk of scar formation is a main concern in long-pulse laser treatment. In this study, we have confirmed the effectiveness and adverse effects of QSNL in the treatment of lentigines, both on the basis of physicians' and patients' subjective assessment, and by using the more objective colorimeter evaluation method.

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REFERENCES

1. Ortonne JP, Pandya AG, Lui H, Hexsel D. Treatment of solar lentigines. *J Am Acad Dermatol* 2006;54(5 Suppl 2):S262-S271.
2. Ho SG, Yeung CK, Chan NP, Shek SY, Chan HH. A comparison of Q-switched and long-pulsed alexandrite laser for the treatment of freckles and lentigines in oriental patients. *Lasers Surg Med* 2011;43:108-113.
3. Chan HH, Fung WK, Ying SY, Kono T. An in vivo trial comparing the use of different types of 532 nm Nd:YAG lasers in the treatment of facial lentigines in Oriental patients. *Dermatol Surg* 2000;26:743-749.
4. Murphy MJ, Huang MY. Q-switched ruby laser treatment of benign pigmented lesions in Chinese skin. *Ann Acad Med Singapore* 1994;23:60-66.
5. Taylor S, Westerhof W, Im S, Lim J. Noninvasive techniques for the evaluation of skin color. *J Am Acad Dermatol* 2006; 54(5 Suppl 2):S282-S290.

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Variable Sized Cellular Remnants in the Nail Plate of Longitudinal Melanonychia: Evidence of Subungual Melanoma

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Dear Editor:

Subungual melanoma (SUM) is a rare variant of melanoma that occurs in the nail unit. However, in Asia, SUM accounts for approximately 20% of cutaneous melanoma¹. In its early stage SUM is often misdiagnosed histopathologically². The delay in diagnosis results in progression of the disease, which may be associated with poor prognosis.

Previously, it was reported that the attached nail plate epithelium is helpful for the diagnosis of SUM³. Here we describe the need for the evaluation of the nail plate in the diagnosis of SUM showing longitudinal melanonychia.

A 65-year-old woman presented with color change of the

Fig. 1. Brown colored longitudinal melanonychia and periungual hyperpigmentation around the 1st fingernail are seen.

1st fingernail (Fig. 1). Brown pigmentation was observed around the proximal nail fold. Under the impression of SUM, the nail was extracted. Histopathology from the nail plate showed numerous variable sized cellular remnants (Fig. 2A, B). The attached nail plate epithelium had a considerable number of atypical melanocytes. On immunohistochemical analysis, the cellular remnants within the nail plate were positive for HMB45 (Fig. 2C).

SUM usually derives from nail matrix melanocytes and spreads to the surrounding areas including the nail bed, hyponychium, and proximal nail fold⁴. When SUM originates from the nail matrix, it presents clinically as longitudinal melanonychia. In the nail unit, the nail plate is formed mainly from the nail matrix. Thus, melanoma cells in the nail matrix may influence the formation of, and be incorporated into, the nail plate. Based on our case, the numerous variable sized cellular remnants of the nail plate seem to be possible evidence for the diagnosis of SUM. In cases presenting with longitudinal melanonychia, evaluation of the extracted nail plate alone may be useful for the diagnosis of SUM.

Cellular remnants in the nail plate may be found in a variety of pigmented lesions that occur within the nail unit. However, in benign pigmented lesions, melanin pigments are mainly observed in the nail plate rather than in the cellular remnants (unpublished data).

For the evaluation of longitudinal melanonychia several biopsy methods have been used⁵. Nail biopsy is performed with or without nail extraction. Whether the nail is extracted or not in the biopsy procedure, careful examination about the nail plate is necessary for the evaluation of

Fig. 2. (A) Histopathology shows an extracted nail plate (H&E, $\times 10$). The rectangle indicates B. (B) Numerous variable sized cellular remnants in the nail plate and atypical cells in the attached epithelium are found (H&E, $\times 200$). (C) HMB45 is positive in the cellular remnants within the nail plate (immunoperoxidase staining, $\times 200$).

longitudinal melanonychia.

REFERENCES

- Kim JH, Park JH, Lee DY. Site distribution of cutaneous melanoma in South Korea: a retrospective study at a single tertiary institution. *Int J Dermatol* 2015;54:e38-e39.
- Izumi M, Ohara K, Hoashi T, Nakayama H, Chiu CS, Nagai T, et al. Subungual melanoma: histological examination of 50 cases from early stage to bone invasion. *J Dermatol* 2008;35: 695-703.
- Ruben BS, McCalmont TH. The importance of attached nail plate epithelium in the diagnosis of nail apparatus melanoma. *J Cutan Pathol* 2010;37:1028-1029.
- Shin HT, Jang KT, Mun GH, Lee DY, Lee JB. Histopathological analysis of the progression pattern of subungual melanoma: late tendency of dermal invasion in the nail matrix area. *Mod Pathol* 2014;27:1461-1467.
- Jellinek N. Nail matrix biopsy of longitudinal melanonychia: diagnostic algorithm including the matrix shave biopsy. *J Am Acad Dermatol* 2007;56:803-810.